PENNSYLVANIA BIRDLIFE

THE PENNSYLVANIA GAME COMMISSION

HARRISBURG, PA.

1966

COMMONWEALTH OF PENNSYLVANIA

WILLIAM W. SCRANTON, GOVERNOR

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PENNSYLVANIA BIRDLIFE

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INTRODUCTION

MORE people are interested in birds today than ever before. Much of this interest is due to the fact that in recent years many people have moved out of the cities into the suburban areas where they are more aware of their feathered neighbors, and where they see birds they have never seen before.

Many people have also become interested in birds because the subject is being emphasized in the public schools so much that they frequently are required, as parents, to provide bird books, charts and other materials for their children to use for reference.

The Game Commission has published this bulletin because of awakened interest in birdlife and the increased demand for educational materials on this subject.

Photo by Karl Maslowski

Female wood duck emerging from nest tree.

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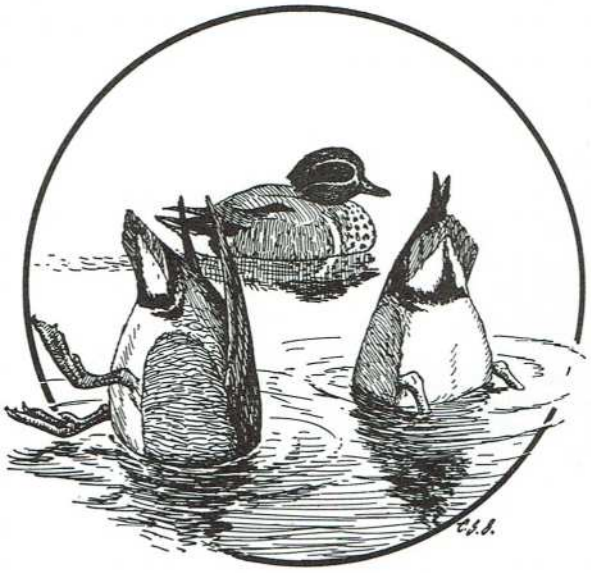


CHAPTER I

WHAT ARE BIRDS?

BIRDS, believe it or not, are descended from reptiles!

Although not too much is known about the evolution of birds because most of the fossil remains found have been too fragmentary and scattered over too many parts of the world, certain observations have been made which we can accept as the truth about the origin of birds.

The oldest of these fossil birds is a strange creature found in the slate beds of Bavaria. This European creature lived about 190,000,000 years ago and appeared to be half reptile and half bird. It is known as the *archaeopteryx*, meaning *primitive winged creature*. It was about the size of a crow and had a long narrow body with a small, somewhat flattened head and very large eye sockets. The jaws protruded in beak-like form, but there was no horny beak and these jaws were equipped with many slender lizard-like teeth set in a groove. The feet had four bird-like toes. The wings were short and rounded with three slender, clawed fingers at the end of each wing. The *archaeopteryx* had a tail that was as long as the body and head together and there were feathers on the end of the tail.

It is doubtful if such a creature could do very much flying. It is believed that it glided from tree to tree like a flying squirrel.

The next known birds appeared in the rocks of the Upper Cretaceous Period in western Kansas. By that time the dinosaurs had almost disappeared from the earth and the earliest known mammals began to appear. The Upper Cretaceous Period was about 70,000,000 years ago, and by that time there were two forms of birds to be found.

The *hesperornis*, which means *bird of the west*, was about the size of a large loon. It was nearly four feet long with a long neck and strong legs ending in four lobed toes. It was a swimming and diving bird which fed on fish and rarely came out of the water except at nesting time.

The *ichthyornis*, meaning *fish bird*, was also a water bird of fish-eating habits but it was much smaller—about the size of a pigeon—and its wings were long and equipped for powerful flight.

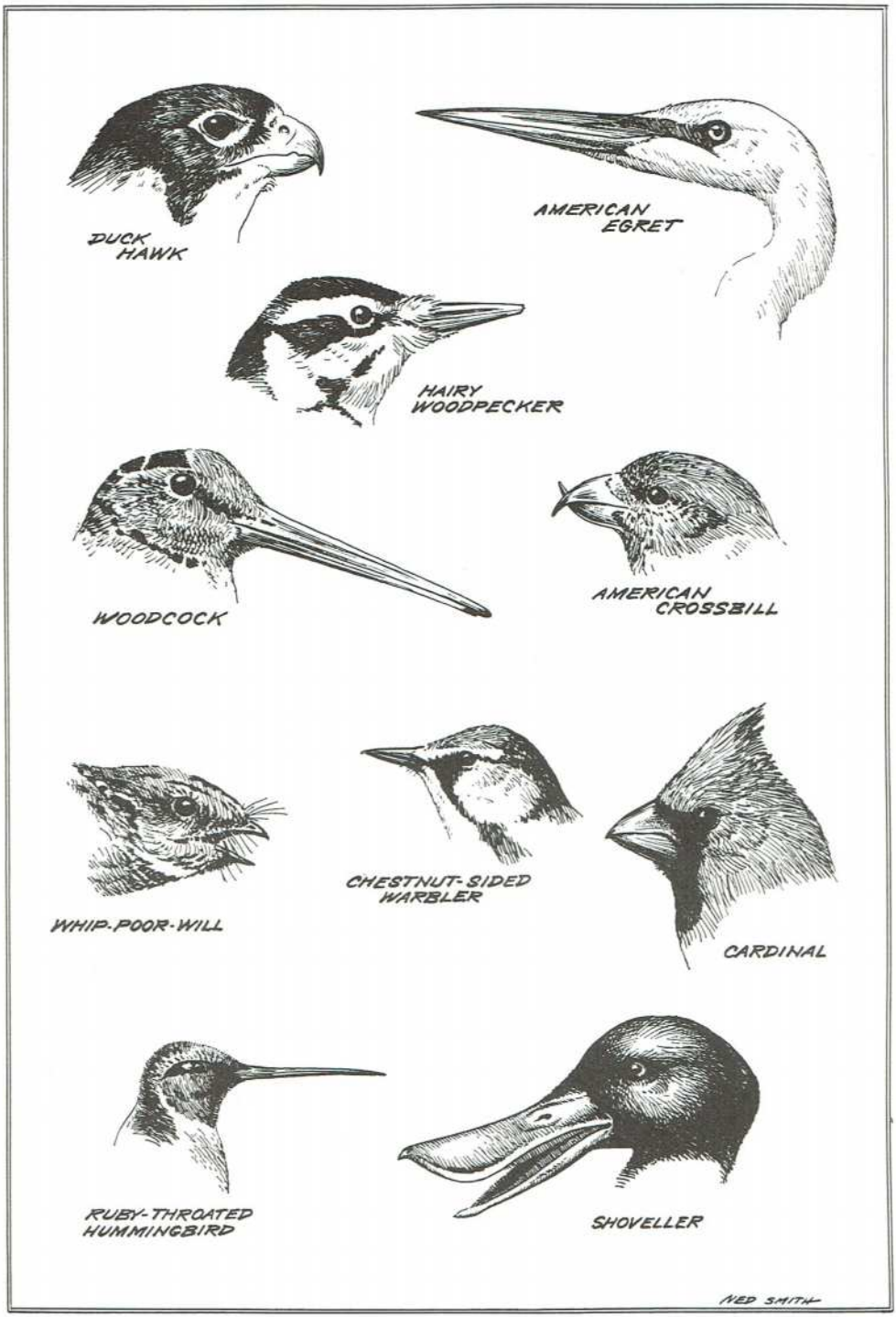
Although both the *hesperornis* and the *ichthyornis* had teeth, the long tail had become much shorter in the evolutionary process since the earlier *archaeopteryx*.

By the beginning of the Tertiary Period, or Age of Mammals, birds had begun to foreshadow the modern type. They were of aquatic habits, but they no longer had teeth. There were also several types of large, ostrich-like birds, the largest of which stood twelve feet in height and is known as the *diatryma*.

By the end of the Eocene Period, there were a wide variety of tropical birds and by the next period, the Miocene, many forms belonging to the North Temperate Zone appeared.

These were the ancestors of our modern birds, believed to have evolved from the dinosaurs, a group of reptiles that had many bird-like traits.

Bird mandibles (bills or beaks).



Characteristics of Birds

All birds have several things in common. They all have feathers, wings, only two feet and a bill or beak with which to gather food.

The skeleton of a bird is well suited to flying; the bones are small and hollow. Compact lungs are assisted by a remarkable system of air sacs which gives the bird more buoyancy. More than one-half of the bird's weight is in its muscles, the largest and strongest of which are in the breast. These are the powerful muscles that move the wings.

All birds are equipped with feathers which scientists believe developed from the scales of the reptiles which were the ancient ancestors of birds. Feathers serve a multiple purpose. Light in weight, they give the bird more buoyancy in the air. Thickly covering the body, they protect the bird, keep it warm and streamline it for better flying.

All birds are warm blooded, like mammals but, unlike humans and some other mammals, they cannot sweat. To cool themselves, birds take additional air into the lungs.

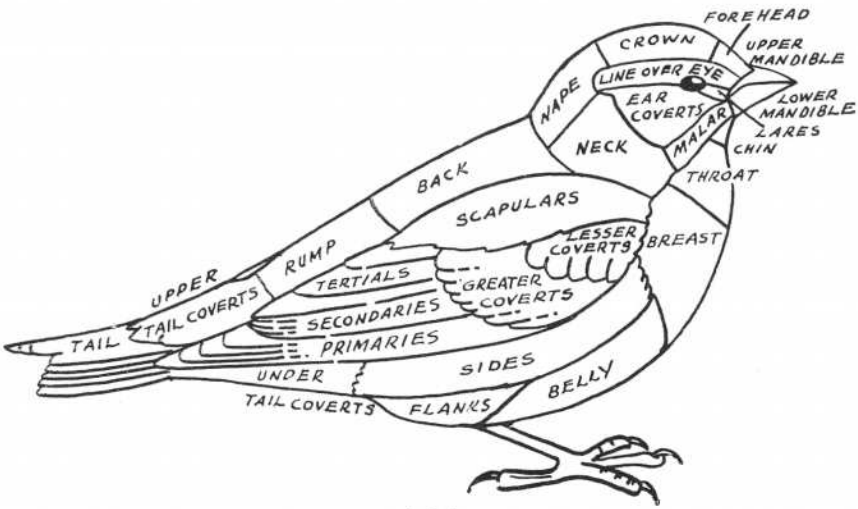
Birds have larger hearts, in comparison to their size, than any other warm-blooded creature. They also must eat a lot because their energy requirements are very high. Some birds, to maintain proper energy, eat several times during an hour.

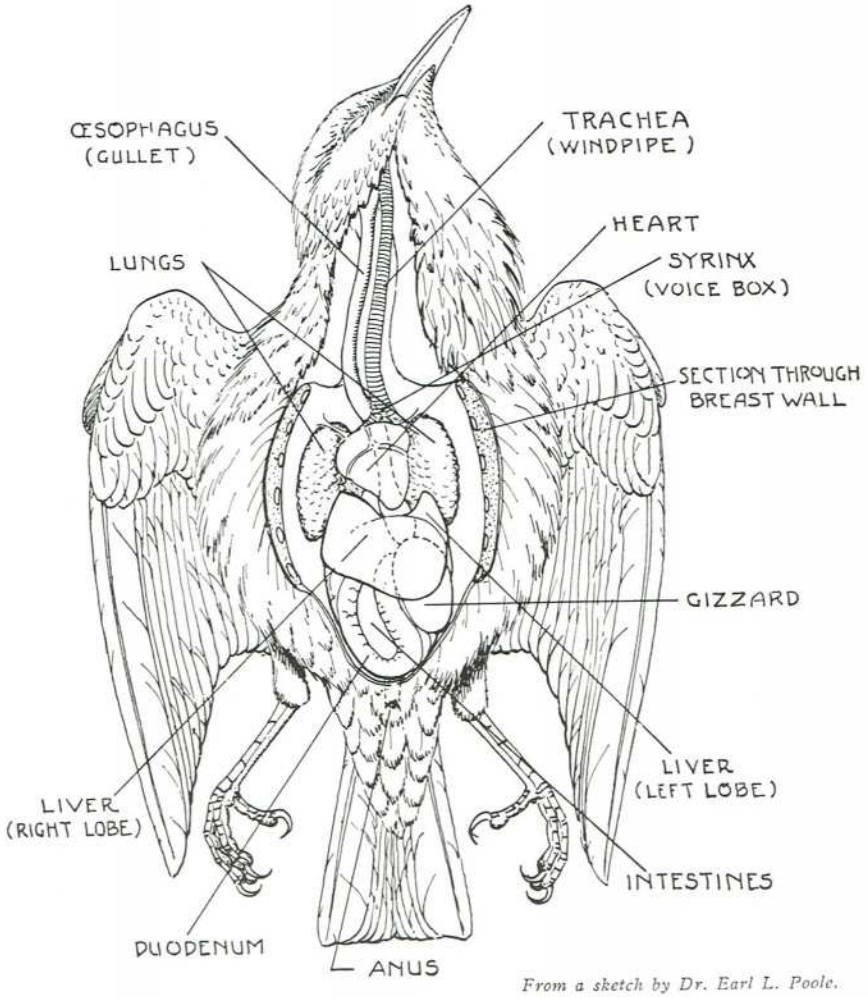
Topography of a Bird

The topography of a bird is its exterior make-up including its feathers and their relative positions, the ear, eye, mandibles, etc., and their relative positions. For descriptive purposes the bird is divided only into seven parts; head, neck, body or trunk, bill, wings, tail and feet.

In speaking of the eye, particularly, it might interest some to know that in most birds the eye is situated laterally near the middle of the side of the head. In the case of the owls, however, the eyes are directed forward.

In most birds the ear is behind and a little below the eye. The ear opening is quite small, and is covered only by a few feathers.





From a sketch by Dr. Earl L. Poole.

For an interesting and detailed discussion of bird topography refer to Vol. I, Key to North American Birds, by Elliott Coues.

In the diagram here you will see all these things indicated. Familiarize yourselves with them. They will help you greatly in your future observations of birds.

Bird Anatomy

The anatomical make-up of a bird is not nearly as complex as we think it is. The diagram here shows the internal organs in relation to each other and a close study of it will graphically depict what the beginner needs to know about the physical features of the feathered neighbors that flit about the home sanctuary.

It might be interesting here to mention the fact that the heart beat of most birds is usually very high, in some birds as much as 800 per minute.

Longevity

How long do birds live? Longevity records are not easily accessible but from what I have been able to gather I should say that the more energetic species of the smaller passerine birds burn out their life energies in about ten to fifteen years.

Speed of Birds

We often ask ourselves the question, how fast do birds fly? The average speed of the hummingbird as timed by interested ornithologists on several occasions was 40 miles an hour, but it can fly 60. The speed attained by the majority of songbirds is really surprisingly slow, however. Many of the small perching birds make less than 20 miles an hour in unhurried routine flight. The kingbird, bluejay, meadowlark, catbird and robin average from 15 to 23, when not under stress. Baltimore orioles have been timed at speeds as low as 12 miles an hour, though under stress they are capable of flying 26 and probably much more. Sparrows, warblers and wrens are all slow movers ordinarily. All these however can fly much faster, at least for a short distance.

Although this bulletin deals primarily with songbirds I think while we are on the subject it would not be amiss to cite the speeds of non-related forms. For instance, the sandpipers have attained a speed of 43 miles an hour by actual clocking. Curlews checked along a seven mile stretch at Daytona Beach averaged 34 m.p.h. for the entire distance. The golden plover, that king of ocean migrants, has an over water non-stop flight at 2500 miles. How long it takes him to do it no one knows. They have been clocked flying up the Mississippi Valley, however, and there is on record an instance of a golden plover being timed by the engineer of a fast train in Illinois. The train was running between 58 and 62 miles per hours, and the bird not only flew alongside with no apparent effort but soon forged steadily ahead. Generally speaking from 40 to 65 miles an hour is the range of nearly all ducks, although the canvasback has been known to attain a speed of 98 m.p.h. Geese average between 40 to 60; quail between 45 to 50; and crows 55 to 60.

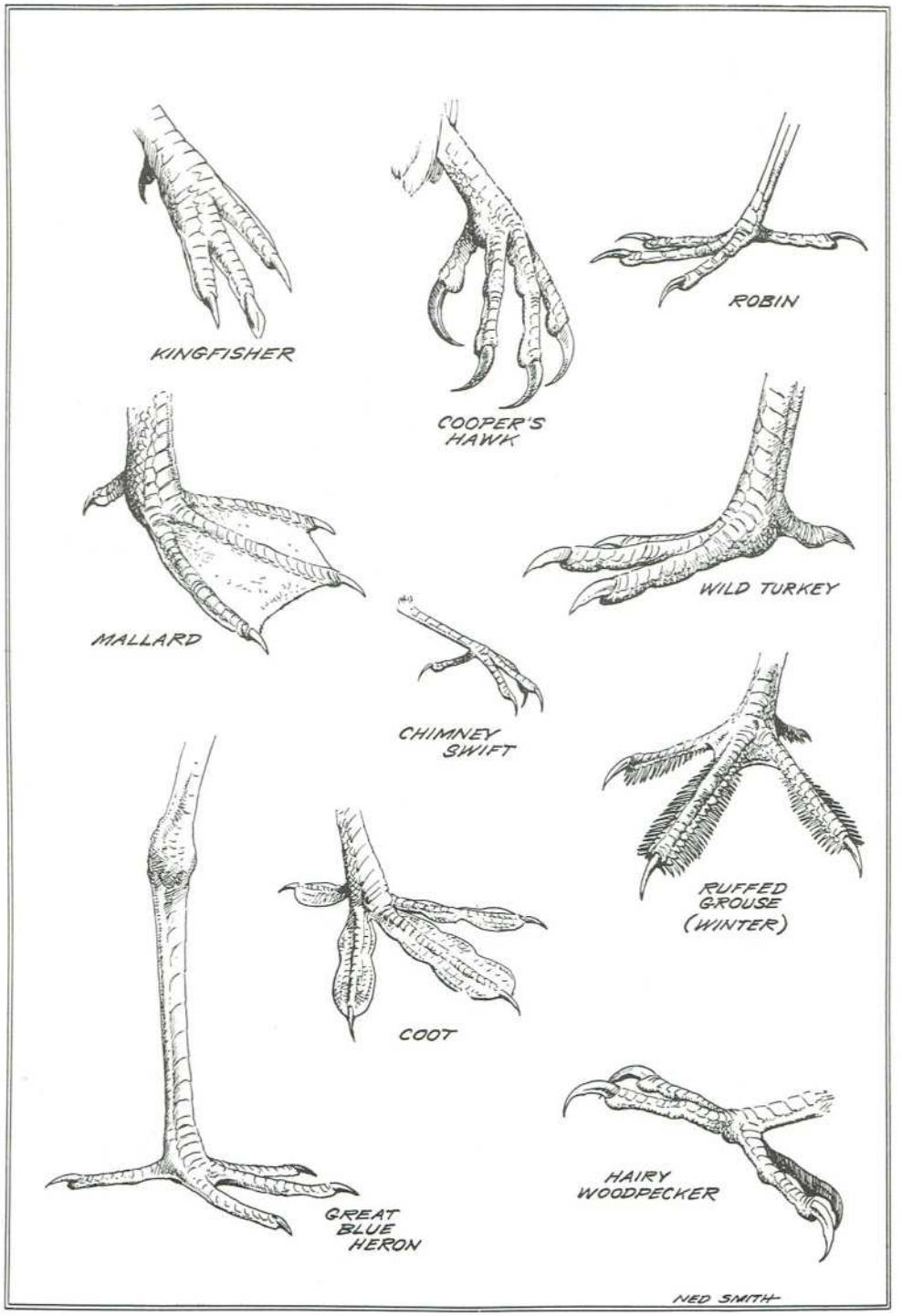
A world's record for a 200 mile distance was flown by a carrier pigeon in 2.7 hours or on an average of 74.5 m.p.h. The duck hawk has been definitely clocked between 165 and 180 miles an hour. An airplane pilot tailed a flock of whistling swans in Pennsylvania; there were about 100 birds in the flock and by flying around the edge of their formation he was able to maneuver them at will. Their maximum speed was about 55 miles per hour.

Weight of Birds

Very little has been written about the weight of birds because such information is as a rule of interest only to scientists. However, believing a brief discussion on the subject worthwhile I am listing below the approximate weights, in ounces or fractions thereof, of birds generally. These weights were taken in drams by Dr. Earl L. Poole, former Director of the Reading Public Museum, who published a paper on the subject in the July 1938 issue of the Auk—a paper well worth having.

The lightest of our birds is the hummingbird which weighs about one-twelfth of an ounce; kinglets weigh about one-fifth; the redstart and brown

Feet of birds.



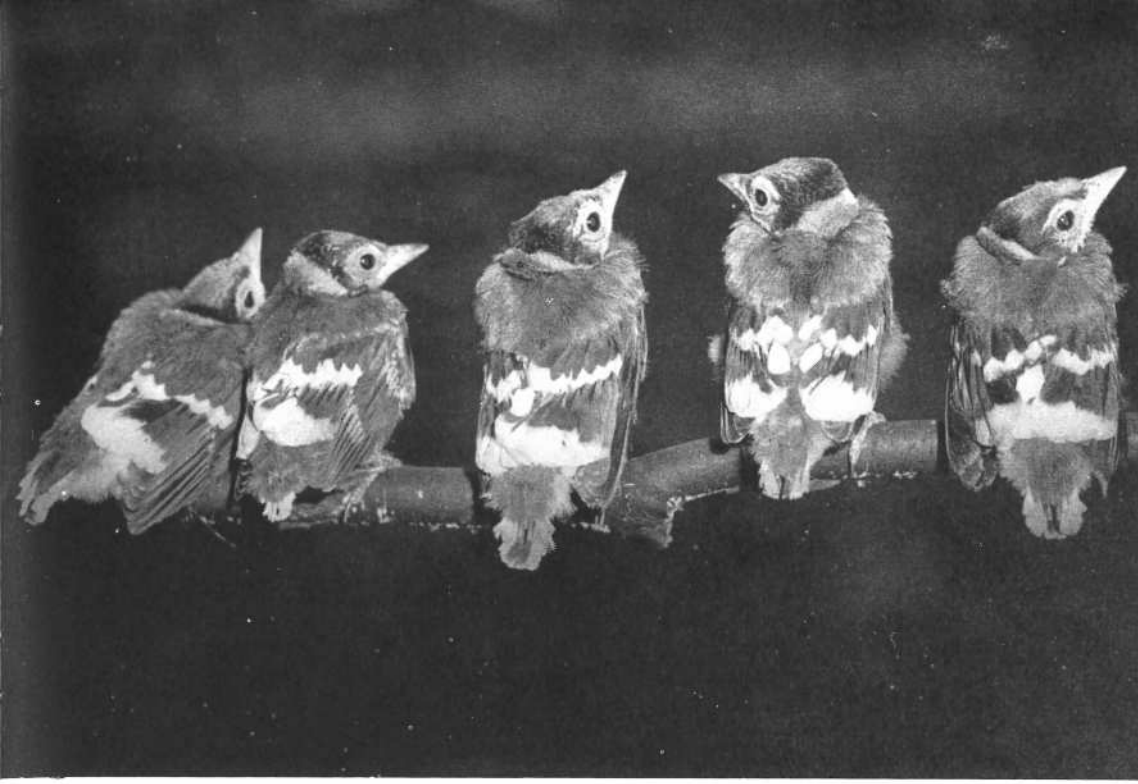


Photo by Hal H. Harrison.

Five little blue jays.

creeper about one-fourth. Most of the warblers, sparrows, some swallows and other birds of equal size weigh from one-third to two-thirds of an ounce. Such species as the vireo, bluebird, catbird, towhee, (chewink), purple martin, the grosbeaks, cowbird, and others come in the one ounce class.

In the two ounce class, are the cuckoos, red-winged blackbirds, robins, starlings, nighthawks, killdeer, and a few of the rails. The bluejay, sharp-shinned hawk, flicker, saw-whet owl, and Wilson snipe weigh around three ounces. The grackle, mourning dove, and male sparrow hawk (the females of all hawks weigh several ounces more) average around four ounces; the kingfisher, and pigeon hawk, five; quail, woodcock, and screech owl, six; king rail, green heron, and long-eared owl, seven.

Ten ounces up to a pound include such species as the fish crow, teal, gallinule, some of the medium sized hawks such as the marsh and broad-winged, the coot, little blue heron, and others.

The species which run between one and two pounds include the goshawk, barn owl, ruffed grouse, common crow, a number of the ducks, including the shoveller, wood duck, ruddy duck, gadwall, etc., the larger hawks the ringneck pheasant and others.

The snowy owl, great horned owl, osprey, and mallard duck come within the three pound class; great blue heron, four; turkey vulture and loon, five, golden eagle, ten; wild turkey, eight to twenty; Canada goose and whistling swan, twelve to thirteen.

Classification of Birds

There are three general classifications of birds in Pennsylvania—game birds, predatory birds, and song and insectivorous birds.

Bird Migration

Where do birds come from, where do they go and why? A study of bird migration could be made an interesting chapter in itself, but with our limited space we can dwell upon it only briefly.

However, one theory is that the migration of birds developed in past centuries as the food supply in the tropics became insufficient for all the nesting birds which tried to bring forth their young there. Urged by the need for solitude and a food supply, certain birds pushed out northward from the ancestral range and established a number of summer homes. After the young were reared instinct drew them back to the region which was familiar to them.

Not all birds migrate, but in Pennsylvania by far the greater number of them do. This phenomenon has been a source of wonder not only to the bird student but to the learned scientists.

For decades ornithologists have been devoting their life's work to the charting of migration routes and distribution centers of birds. As a result of their painstaking efforts we of today know pretty definitely where many species come from, where they nest, what migration routes they follow, and so on.

We know, for instance, that many of our familiar summer birds spend the winter in South America, coming to us only a few months each year to rear their young. Many species do not even stop here but pass through on their way to more northerly nesting grounds and then back again when the purples, reds and golds of autumn herald the change of seasons.

Migrating pintail ducks.

Photo by P. J. Van Huizan.

The greater number of our songbirds visit us from distant southern climes. Nevertheless the tree sparrow among others, which arrives in winter returns to its Canadian nesting grounds in early spring. The slate-colored junco, brown creeper and golden-crowned kinglet, however, breed in Pennsylvania as well as in the North country.

Certain birds like the song sparrow and crow migrate only slightly, nesting individuals moving southward in winter, their places being taken by other individuals of the same species from farther north.

The shore of Lake Erie is a well-known resting place for birds that fly over this large body of water. In the fall, at Presque Isle, the trees are often alive with birds which have just made the flight.

Many birds which are found in abundance at Erie in the fall rest there until they are able to take another flight; then they start for feeding and resting grounds south of Pennsylvania.

Molting

A healthy adult bird renews its plumage at least once a year. This process is called molting. The molt is semi-annual, as a rule, and in many cases more than one molt is required before a mature bird attains the perfection of its feathering. This change commonly occurs when the duties of incubation are concluded, and the well-worn plumage most needs renewal, as happens in late summer and early autumn months in our latitudes. However, some birds, such as swallows and hawks, may sometimes put off the process until winter.

The most striking ornaments donned for the breeding season, as the elegant plumes of many herons, are usually worn but a brief time, being doffed in advance of the general fall molt; and males of very many birds which put on special nuptial ornaments make room for these by doffing feathers from the parts where the new ones grow.

As a rule, feathers are molted so gradually, particularly those of wings and tail, and so simultaneously upon right and left sides of the body, that most birds are seldom deprived of the power of flight; the first flight-feathers acquired by young birds are usually kept until the next season. Numerous birds like the tanager, the male of which is brilliant in breeding dress, molt into a postnuptial plumage in which they resemble their homely mates. It is difficult to lay down any rules of molting for particular groups of birds, since very closely related species may differ greatly in respect to their changes of plumage and the subject has not yet received the attention its interest and importance deserve.

Home Life of Birds

Why do birds build their nests at certain times of the year? In the bird world, as in the plant world, a natural pattern is followed. In the plant world the tree buds, leafs out, blossoms, fruits, loses its foliage and so on. In the bird world a bird migrates, mates, builds its nest, lays its eggs, incubates, rears its young, molts and returns to its winter quarters, all as a part of a regular series of events.

The question is often raised, why do some birds rear only one brood and others two or three? The answer is, that if the period between the time the nest is built and the young reared is short enough, the parents may still be in a physiological condition for further reproduction, and a

Photos by Hal H. Harrison.

Nesting study of a mourning dove: (Top left) — Pure white eggs of the dove in a nest of twigs in a cedar tree. (Top right) — Nestlings a few hours old. (Center) — Adult enters nest to brood young. (Bottom left) — Nestlings eight days old. (Bottom right) — With bills inserted into the mouth of an adult, young doves are fed "pigeon milk" by regurgitation.

Nest and eggs of bobolink.

Nest and eggs of red-winged blackbird in cattails.

House wren that nested in swimming trunks.

Photos by Hal H. Harrison.

second family may be expected, or even a third. The activities which generally herald courtship among birds constitute primarily a proud exhibit of plumage, fighting, dancing and other antics, the male birds display in order to attract and win their mates.

The nature of a bird's nesting site depends for the most part upon the necessity for protection, the condition of the young at birth, temperament, habit, whether tree living, ground inhabiting or aquatic in location; or either in field, marsh, or woodland.

Nesting material in most cases depends upon the nature of the bird's haunts. For instance, the nests of marsh birds are usually made of reeds or woven out of wet marsh grasses. Woodland birds usually use twigs, rootlets, bark, leaves, and moss; those that inhabit the fields usually use dry grasses. Everything depends upon the particular habitat the bird is adapted to, and what is available there is the way of nest material.

The nest is ordinarily built by the female, although the male often makes a pretense at helping. It may be built in a day and occupied immediately, or it may take longer. Sometimes it is left apparently deserted before being occupied.

In some species, notably the long-billed marsh wren, the nest-building instinct does not seem to be satisfied by the making of a single structure, and the male continues his work after the female is setting, building one or more additional homes in which he possibly may sleep. These are sometimes called "cock-nests," or "dummy nests."

From an architectural standpoint nests differ greatly even when the material of which they are composed is the same. Nest building is probably an instinctive activity such as it is with bees or wasps, and you will find a young bird making its first nest just as neatly and compactly as its parents even though it never saw one made before.

Incubation does not ordinarily begin until egg laying is completed. But there are exceptions. The owls for example begin incubation after the first egg is laid. The difference in size of the young birds as they progress toward maturity is quite marked. The period of incubation depends largely upon the size of the egg and the nature of the young. Cowbirds for instance require ten days, sparrows from twelve to thirteen, thrushes from thirteen to fourteen. The hummingbird's egg, smallest of them all, requires from fourteen to fifteen days. While the female of many birds is on one of her feeding excursions the male usually stands on guard at the edge of the nest or nearby. The males of many birds assist in incubation, including grosbeaks, shore birds and others. Sometimes he feeds his mate on the nest but more often he calls as he approaches and she flies out to meet him.

Most birds are altricial or helpless and are confined to the nest after hatching. They are ugly featherless creatures with more head than body. They require parental care until able to leave the nest and for variable periods thereafter. Songbirds and birds of prey are included in this group. Others, like the grebes, shorebirds, woodcock, waterfowl and upland game birds are precocious in that they are fully feathered and able to leave the nest as soon as they are hatched.

Periods of hatching vary according to the composition of the egg. Smaller birds like the songbirds and shorebirds require from fourteen to sixteen days to complete hatching; game birds vary from twenty-three to thirty-six days, as for example the bobwhite quail twenty-three days, the wild

turkey twenty-eight days and the Canada goose thirty-six days. Hawks and owls require from twenty-one to twenty-eight days while waterfowl usually hatch in twenty-eight days. The altrical species require less time for hatching whereas the precocious birds take longer.

Birds that feed by regurgitation and those that bring back large pieces of food naturally do not feed as often as those which make the trip to the nest with only their bills full. For instance, hawks feed about once an hour; hummingbirds about once in twenty minutes. Dr. Arthur A. Allen reports having watched a pair of chickadees at their nest make thirty-five trips in thirty minutes. A pair of rose-breasted grosbeaks are recorded as feeding their young 426 times in eleven hours; a house wren 1,217 times in fifteen and three-quarter hours. Young birds require a lot of food, and a young robin, during an experiment, consumed fourteen feet of earthworms in one day.

The number of eggs in a full set or clutch range from one to twenty or more. No law governs this number although birds of temperate zones usually lay more eggs than those in the tropics. The color of a bird's egg is due, in part, to pigment deposited by ducts while the egg is receiving its shell in one of the lower dilations of the oviduct.

Photo by Karl Maslowski.

Canada goose at nest.

CHAPTER II

WHAT GOOD ARE BIRDS?

Economic Values

SOME biologists maintain that without birds, no human being would be able to exist on earth; the insects would devour and destroy all the vegetation!

Although this opinion may be somewhat exaggerated, it is obvious that birds rate high on the list of essentials for life on earth.

Most birds are useful to mankind. Some do far more good than harm. Only a few do more harm than good. In Pennsylvania, song and insectivorous birds have been protected since 1858. Certain migratory birds came under Federal protection with the signing of the Migratory Bird Treaty with Great Britain in 1916, and the passage of The Migratory Bird Treaty Act in 1918.

The practical value of birds may be divided into at least five main categories:

1. Insect Control
2. Weed Seed Control
3. Rodent Control
4. Scavenger Values
5. Domestic Birds

Birds as Natural Controls on Injurious Insects

Our songbirds are the natural enemies of insects. For this reason and others, they are friends of man, for man has waged a never-ending battle against the vegetation destruction of insects since the beginning of time. Wherever there are insects, however, there are also birds.

Examples are many of birds having actually come to the rescue of humans when a plague of insects or rodents became serious menaces. Classic among them, however, is the famed plague of Mormon crickets that descended upon the wheat fields in Utah in 1848. Just as the Mormons were giving up hope of saving their crops, great flocks of gulls came from the west, fell upon the crickets and consumed them. Today, a monument to the gulls stands in Mormon Temple Square, Salt Lake City, commemorating the event.

It is a staggering figure to contemplate, but many years ago the United States Department of Agriculture estimated the annual value of birds in destroying insect pests at over $350,000,000.

No greater examples of the devastation which can and is being caused by certain injuries species of insects can be cited than to refer to the ravages of the tent caterpillar, the Japanese beetle, the army worm, the corn borer, the termite, the grasshopper, the spotted cucumber beetle and others that are equally destructive.

Although about three-quarters of a million species of insects are known in the world today, it is not the many kinds that need alarm us, but rather it is the remarkable ability of insects to reproduce so rapidly and in such

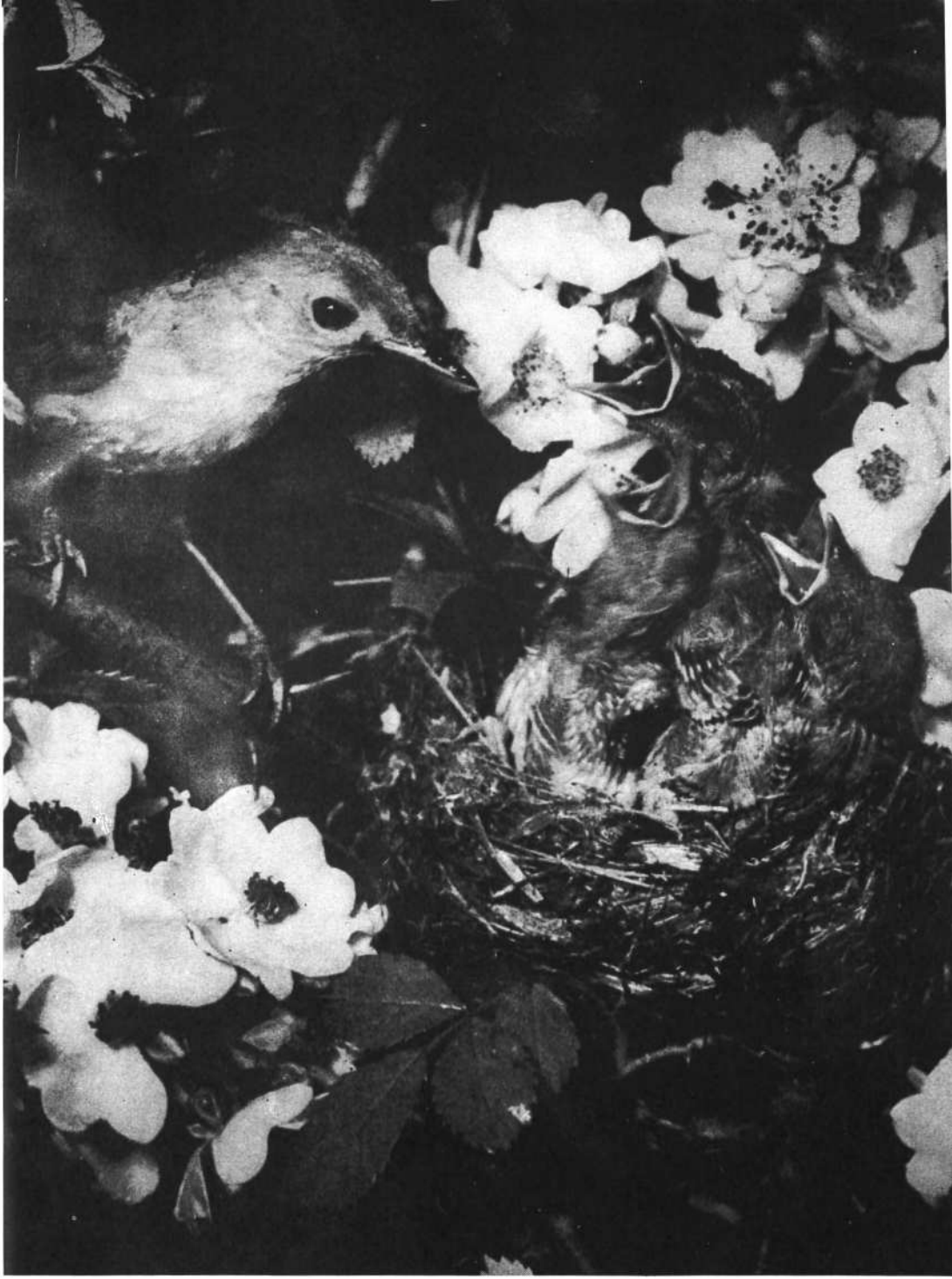


Photo by Hal H. Harrison.

What that dainty nest of a yellow warbler in the rose bush does to an otherwise busy family is amazing.

great numbers. It is possible for a female insect to be the ancestor of 60,000,000 of her kind in a single season.

It is astounding, too, to realize the destructive capacity of certain insects. For example, the codling moth and curculio apple pests are said to have an average cost of about 12,000,000 a year in reduced value to the apple crop. In some years more than $8,000,000 additional each year is spent to spray the trees to prevent even more damage. Thirty-six species of birds are known to feed upon the codling moth.

The chinch bug causes about $20,000,000 damage annually to the grain crop in America. Twenty-nine different species of birds are known to show a preference for this damaging insect.

Thirty-four species of birds are known to feed upon the potato beetle. Imagine what would happen if this were not true, knowing that a pair of potato beetles will multiply to 60,000,000 a season if unchecked.

E. H. Forbush has estimated that one chickadee would destroy 138,750 eggs of the cankerworm moth during the 25 days in which the female moth lays her eggs. Aphids will produce from 10 to 13 generations in one summer, and it has been estimated that one warbler can destroy 3,500 aphids in one hour.

Among the groups of birds that are specialists in destroying insects we can list the flycatchers, kinglets, gnatcatchers, wrens, warblers, vireos, swallows, swifts, cuckoos, nuthatches chickadees and creepers. There are others whose diet includes insects as well as fruit and seeds, such as the sparrows, waxwings, blackbirds, thrushes, mimic thrushes and many others. Some birds specialize on certain foods. Flickers love ants; the bobwhite is particularly fond of chinch bugs; the cuckoos are death to hairy caterpillars, especially the destructive tent caterpillars; grasshoppers are high on the list of favorite foods of the sparrow hawk; the screech owl is a June bug killer. Even the crow, whose reputation is as black as his feathers, destroys many of the large tomato and tobacco worms and many over wintering corn borer larvae, while the despised English sparrows and starlings consume many Japanese beetles.

Among our worst Agricultural pests, the army worm has 43 bird enemies; pill-bugs, 110; the browntail moth, 31; chestnut weevils, 85; chinch bugs, 29; clover root borers, 94; clover weevils 48; codling moths 36; gypsy moths; 46; horseflies, 49; leaf hoppers, 175; orchard tent caterpillars, 43; potato beetles, 42; white grubs, 95; and wireworms, 205.

Birds as Natural Controls on Undesirable Weeds and Seeds

Certain species of birds are voracious consumers of weed seeds.

What birds eat and how much they eat is not a matter of speculation. Thousands of scientific investigations have been conducted to prove the facts, and when scientists tell us that 23,000 weed seeds were counted in the stomachs of three mourning doves, we may accept it as an indication that the mourning dove is economically useful to us. Indeed, two-thirds of the mourning dove's diet is weed seeds, the remainder waste grain.

High among our most valued weed destroying birds are the members of the family which includes the sparrows, finches and grosbeaks. Their bills are especially adapted by nature for the task of cracking the hulls of seeds.

Examinations of the crops of bobwhites have revealed many gorged with ragweed seeds. More than 50% of the quail's annual food is weed seeds.

During the nesting season, most birds, even inveterate seed-eaters, feed their young insects or other animal matter. Two exceptions are the goldfinch and the mourning dove. Even to their nestlings these two species feed partly-digested vegetable matter.

In his book, "The Practical Value of Birds," Junius Henderson makes the following observation: "In view of all the evidence that has been published it is astonishing that anyone should doubt the value of birds as enemies of weeds."

Birds as Natural Controls on Rodents

Once it was believed that "the only good hawk was a dead hawk" and the birds of prey, such as hawks and owls, were killed indiscriminately. Years of research and study of the food habits of predatory birds have proved this a fallacy. Hawks and owls are useful in the scheme of nature in controlling rodents. Research studies have proven that mice are the mainstay of most birds of prey.

Examples of the economic value of birds of prey are many. A plague of field mice hit Nevada. Great flocks of hawks and owls suddenly appeared and the plague was ended. The government investigators estimated that almost a million mice per month were consumed by the birds.

In Pennsylvania, all hawks are protected except the three accipiters or "chicken hawks"—the goshawk, Cooper's Hawk and the sharp-shinned hawk. Even these three species are protected in a limited area during the

Crested flycatcher at nest.

Photos by Hal H. Harrison.

Bluebird at natural nesting cavity.

Photo by Karl Maslowski.

Red-shouldered hawk with snake.

fall migration period. All owls are protected except the great-horned owl and the snowy owl. The very fact that the state protects the majority of its birds of prey indicates that the evidence of these birds' usefulness must certainly be in their favor.

Any species of hawk which is generally beneficial may become locally injurious. The red-shouldered hawk that steals a chicken is a rare individual, but with natural food scarce, it may do so. Caught in the act, one red-shoulder will subject its entire family to condemnation yet, in the examination of 220 stomachs of red-shouldered hawks, poultry was found only in the stomachs of three. It is interesting to note, however, that mice were found in the stomachs of 102.

The Role of Birds in Crop Damage

The dollar and cents value of birds to man is tremendous. The United States Department of Agriculture once estimated the value of birds as insect destroyers alone at about $200,000,000 annually, or a little over thirteen cents an acre, for the humid regions of the country and about $150,000,000, or a little over twenty-two cents an acre, for the arid regions. The total of $350,000,000 is about one-fourth of the estimated $1,590,040,500 total damage then estimated to be caused by insects in the United States. At the same time the Department of Agriculture also determined that agriculture losses due to insects each year amounted to ten percent or more of the entire production. In some states this loss was even higher. In some years this is true in Pennsylvania. The value of birds to agriculture in Pennsylvania in insect and weed control alone has been conservatively estimated at $7,000,000.

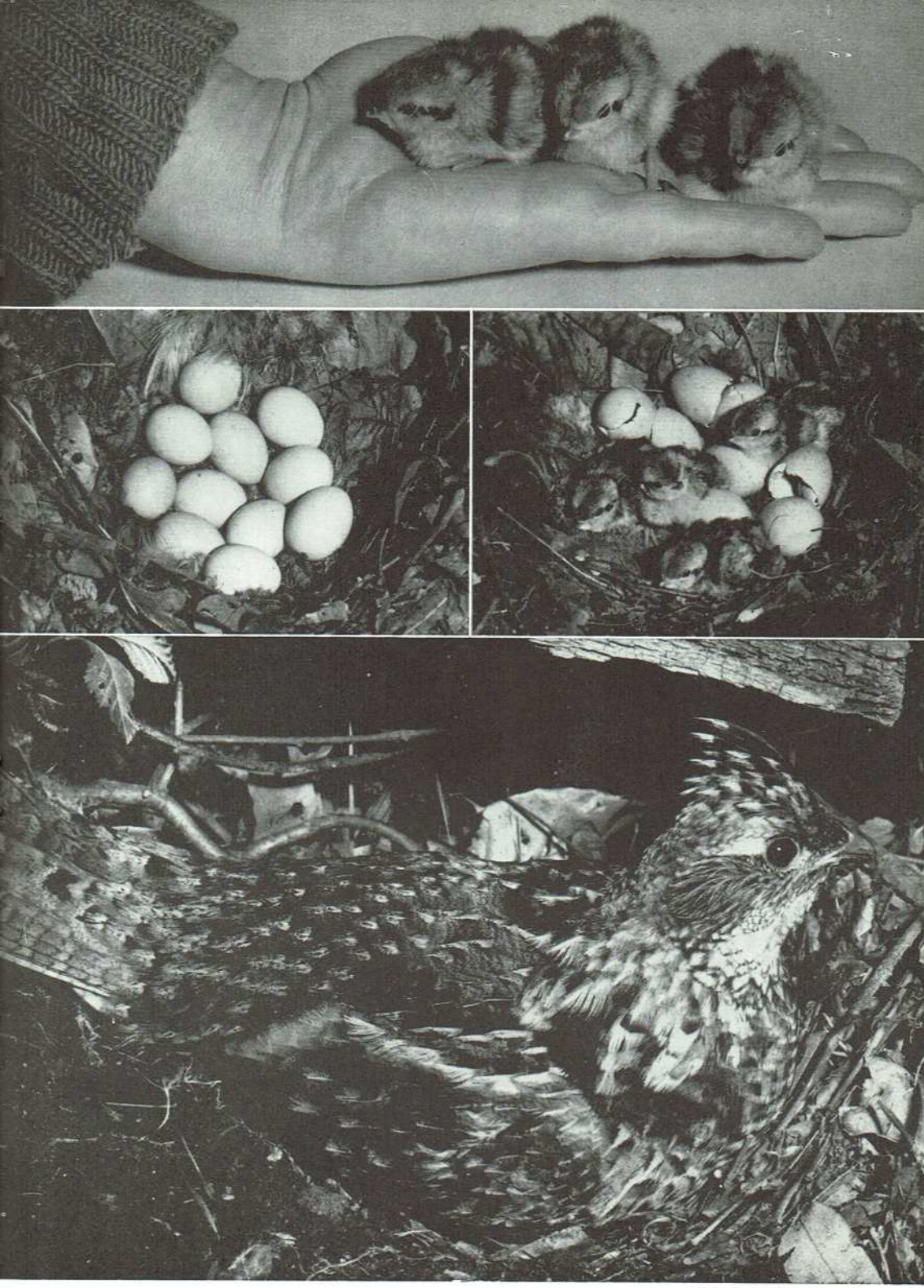


Photo by Hal H. Harrison.

Nest life of Pennsylvania's State Bird, the ruffed grouse: (Top) — Three baby grouse at hatching time. (Center left) — Eleven grouse eggs in a nest under a fallen fence post. (Center right) — Same nest at hatching time. (Bottom) — Female grouse incubating her eggs. The male never visits the nest.

Birds as Game

In considering wild birds as game, one must place two values upon them . . . recreational and practical. Of the former, it need only be pointed out that upward of a million hunting licenses are now sold annually in Pennsylvania to demonstrate most forcefully the sporting value of hunting. Of those hunters, the majority find happiness afield in hunting upland game such as the ring-necked pheasant, bobwhite quail, ruffed grouse and wild turkey. Migratory birds, such as woodcock, mourning doves, coots, rails and gallinules have their followers, and, although not an important duck hunting state, Pennsylvania does offer its nimrods a few excellent areas for waterfowl gunning.

Tramping through field and forest in quest of game birds is also sure to improve the health—both mental and physical—of the hunter. Tired, business-weary brains relax. The fresh air, exercise and exhiliration of hunting is almost certain to make the hunter feel "like a new man." From the food angle, the ringneck pheasant is Pennsylvania's outstanding game bird.

Other Bird Recreations

Birds add immeasurably to our enjoyment of life. They please our sight with their beautiful colors, graceful forms and sprightly actions. They delight our ears with their cheerful, trilling songs. They excite our imagination with their interesting behavior, power and grace of flight, their migratory comings and goings, and their dramatic presentation of their battle for existence.

Birds as Scavengers

Vultures have been termed "the garbage cans of Mexico," and in many areas throughout our southern states, these carrion-loving birds serve a similar purpose.

In Pennsylvania, we have only the one vulture, or "buzzard," the big turkey vulture. Its brother, the black vulture, does not occur as far north as our state. Wherever it is found, the turkey vulture is at work throughout the day, soaring high in the sky, looking for carrion below.

The crows and the gulls are even more valuable as scavengers in Pennsylvania than the vulture. The sight of a crow or a small band of these black birds feeding upon the bodies of animals killed along the highways is common to motorists throughout the Keystone State. Gulls serve a similar purpose along our lakes and streams, feeding upon dead fish washed ashore. The few bald eagles that inhabit Pennsylvania are also valuable as scavengers.

Domestic Birds

We can thank wild birds for the domestic fowls of our modern barnyards. Our turkeys are descendants of the Mexican turkey; our geese from the gray-lag of northern Europe; chickens from jungle fowl; pigeons from rock doves; and our ducks from wild mallards and muskovy.

Even the most sophisticated city dweller will stop to watch with interest and admiration if he chances to see a wild bird or hear the honking of a flock of wild geese overhead. Birds are a part of our great American heritage of beauty.

Photo by W. Bryant Tyrrell.

The bald or American eagle—Symbol of our freedom and independence. The few bald eagles which inhabit Pennsylvania are also valuable as scavengers.

The fact that birds are everywhere makes it so easy to enjoy them. There are many busy housewives whose daily existence within their homes is brightened considerably by the winter birds that come to the window feeders, or the summer birds that sing and nest in the shrubbery about the home.

Those who go afield for any reason . . . hunting, fishing, trapping, hiking, swimming, skiing . . . inevitably enjoy the companionship of birds. Many bird watchers have been attracted to the hobby through incidents of adventure that befell them while out of doors in other pursuits. Perhaps it was the first realization of the infinite beauty in a dawn chorus of birds in early summer; the flash of a gayly-colored redstart as it fluttered to earth through fragments of woodland sunlight; the ethereal flutelike song of a hermit thrush, ringing through the stillness of a hemlock forest at twilight; the weird sky dance of a funny little woodcock; the day by day joy of watching a family of robins outside a window; or the graceful soaring of a hawk high in the blue sky.

One could hardly "sell" the hobby of bird watching on its healthful merits alone. It would be like trying to interest a youngster in spinach merely because it was good for him. But one cannot overlook the indirect benefit of bird study to one's health. The exercise and fresh air gained while afield is certainly an important factor in the recreational value of birds.

Finally, there is an educational value that is not always recognized by beginning bird students. For the young, there are lessons to be learned from the lives of wild birds. For the adult one need only look at the ever-growing list of bird books and the many periodicals devoted entirely to ornithology, to realize that birds, or the interpretation of the behavior of birds, has made great inroads into our educational environment.

The opening paragraph in Henderson's "The Practical Value of Birds" adequately sums up the answer to "What good are birds?" Here it is:

"Whatever tends to make the world better and happier; whatever ministers to the esthetic longings of the human soul; whatever leads the thoughts of men and women for the moment from the sordid pursuit of gain or from the race for personal aggrandizement to beauty in any form; whatever entices the tired and care-worn people for a time from the shop, or office, or store, or mine, or quarry, and brings them into a closer contact with the beauty, grace and charm of things out of doors; is of direct material value to the human race, even though that value may not be measurable in yards, acres, tons, bushels or dollars."

Bird watching is a popular hobby. There is a more advanced hobby which is perhaps even more fascinating and that is bird photography. To be a good bird photographer, one needs three things:

1. A thorough knowledge of birds in the field.
2. Adequate camera equipment.
3. Patience—a lot of it. Without patience the other two are useless. A bird photographer must wait for the right opportunity and the right shot, and sometimes this takes hours.

It should be obvious that one must know birds in order to photograph them properly. The diagnostic field marks of each species must be known

A dummy of tins cans (left) is replaced later by the real camera (center) and the unsuspecting alder flycatcher is photographed.

"Let no layman suppose for a moment that to him have been left the crumbs of ornithological exploration." Much work remains to be done by amateurs such as the one shown here watching distant birds through a high-powered scope.

Photos by Hal H. Harrison.

Raymond J. Middleton, of Norristown, one of the country's leading bird banders, places a government band on the leg of a towhee which he has just caught in the trap on the ground.

intimately. For example, a photograph of a tree sparrow should show the central breast spot; a photograph of an adult killdeer should show two rings across the upper breast; the whitish throat of a swamp sparrow should be recorded to eliminate confusion with the similar chipping sparrow; and

the lower mandible of a cuckoo would be a necessary part of a photograph of either a yellow-billed or a black-billed cuckoo.

A thorough knowledge of birds saves the photographer hours and even days of time. A seasoned bird man would never set up on the nest of a ruby-throated hummingbird, hoping to photograph the brightly-colored male. He would know that only the female attends the nest.

With a knowledge of instincts, the photographer knows that a bird's attachment for its nesting site increases as time goes on. Thus, one would not only have little chance of photographing a wary bird building its nest, but he would likely jeopardize the entire project. The bird would probably desert. The same bird, later with young in the nest, might pose for pictures entirely unafraid.

Such examples are legion. But aside from these facts, bird photography would be a most boresome task if the man behind the camera were not intensely interested in his subject as well as his pictures.

As in all trades, there are a hundred and one little tricks that will aid a wildlife photographer to get more pictures and better pictures. Most of these are the results of actual experiences in the field, and every photographer who has seriously attacked the subject has found for himself many short-cuts and better methods of achieving the best results. Here, indeed, necessity is the mother of invention.

Portrait of a wood thrush brings to mind Emerson's words: "Beauty is its own excuse for being."

Photo by Hal H. Harrison.

CHAPTER III

HOW YOU CAN KNOW BIRDS BETTER

THE only pre-requisite for taking up bird watching is an interest in wild birds. To most amateur ornithologists, field observations are the most interesting aspect of the hobby. Others, handicapped by occupational duties or illness, must do their bird watching through the window, the pages of books, or through the experiences and observations of others.

Field Observation and Study

In order to maintain a permanent interest in birds through field observations, a few pieces of equipment are essential. They are: binoculars (the very best you can afford); a field guide with color plates; an illustrated book of life history studies; a field check-list and notebook; and a permanent record book.

For serious work afield, prism binoculars are necessary, for it is absolutely imperative that birds be identified correctly when they are observed. Many birds, especially warblers in their various plumages, sparrows, vireos, and birds seen at great distances, such as hawks and waterfowl, are too difficult to recognize with confidence. The inability to identify what is seen will eventually lead to discouragement.

The choice of an illustrated field guide is a matter for each student to decide. Roger Tory Peterson's "Field Guide to the Birds" is considered the bird "Bible" to many, but there are others that merit your consideration too. Life history books are legion, and a number are suggested elsewhere under the heading, "Books Suggested for Advanced Study." W. E. Clyde Todd's (Carnegie Museum, Pittsburgh) "Birds of Western Pennsylvania" is a "must" for serious bird watchers west of the Alleghney Mountains, and it is quite adequate for students throughout the state.

The study of birds will be more interesting if check-lists and notes are kept. A number of printed check-lists are available. Bird clubs often print their own, listing the birds that may be anticipated in a certain locality.

Supplementing the check-list should be a field notebook . . . a place to record observations of the moment, such as interpretations of bird songs, notes on behavior, finding of nests, counting of migrants, and, at all times, dates and exact locations.

At home, a permanent file of notes should be maintained. Into this book are transcribed the hurried notes made in the field and the species recorded on the daily check-lists. This book will contain a wealth of knowledge and observations made by YOU. Thus, it is YOUR bird book, one to be referred to from year to year, not only for comparisons, but for happy reminiscences.

The beginner's first problem is the correct identification of what he sees and hears. The pocket field guide is invaluable here. More complete

Bird club members welcome a noon-day fire after a brisk winter morning afield. Such societies are scattered throughout the state.

Photos by Hal H. Harrison.

A "bird's eye view of a bird club looking at a bird. Members of the Audubon Society of Western Pennsylvania.

descriptions and larger color plates are available at home or in the public library. Most museums offer both mounted specimens and skins for study.

Perhaps the greatest boon to a beginner is field companions who have advanced from the early stages of bird watching and are able to identify birds quickly and accurately by sight and by song. Affiliation with a bird club or Audubon Society solves this problem.

Nighthawk and eggs on a gravel roof.

Photos by Hal H. Harrison.
Killdeer incubating eggs in gravel.

Wild birds are wary. It is well to remember this and to wear somber clothing afield, walk quietly, move slowly and blend as much as possible into the surroundings. Loud talking, laughter and quick movements will deter serious work afield.

Morning is the best time to observe birds. The dawn chorus on a June morning is a symphony unrivaled in the musical world. But the flute-like melodies of the wood and hermit thrushes, ringing through the cool stillness of evening are never to be forgotten woodland lullabies.

Bird Clubs and Audubon Societies

"Birds of a feather flock together."

So do bird watchers. Scattered throughout Pennsylvania are thousands of amateur ornithologists banded together in clubs and societies, all talking the same language. Here, the laborer rubs elbows with the president of the bank on an equal basis, fraternizing and enjoying the happiness of the occasion. The "occasion" may be one of the planned indoor meetings of the club, or it may be one of the many field trips conducted in areas where leaders know that birds will be observed.

Beginners and seasoned students alike find these clubs essential to their continued interest in bird watching. They find them a spur to future activities and a place to "let off steam" on current observations. Every community should have one.

Bird Banding

Bird banders must be authorized by the Fish and Wildlife Service of the United States Department of Interior and the Pennsylvania Game Commission. Qualifications are rigid and very few are authorized to carry on this important work in our Commonwealth.

Although much concerning the migration and movements of wild birds is still an unanswered riddle, much has been learned through this systematic process of banding the legs of captured birds.

The banding itself is rather simple. Birds are caught in especially designed traps. A small aluminum band is applied to one leg of each. The band bears a number and a request to notify the U. S. Fish and Wildlife Service, Washington, D. C.

The bander records the name of the species, sex, date of banding, place, etc., and the information is sent to Washington for filing.

In the future, perhaps years later, when a bird bearing a band is found dead or is trapped in another locality, the Fish and Wildlife Service is advised. Through thousands of such records, we have learned much about the migration of birds. Principal Flyways with their breeding and wintering grounds, and their systems of migration routes, have been definitely located. Banding has also helped establish the age of birds, and the fact that they often return year after year to the same locations.

Indoor Study Material and Aids

Those who want to study birds indoors must resort to other methods than field trips.

City dwellers, for whom trips to the field are difficult, may visit the Natural History Museums. The museum specimens are presented in such a way that the bird appears in environs similar to those it inhabits in the wild. Much can be learned by studying bird life as presented in the Museums. These mounted specimens will not fly away and may be observed and studied at leisure and at very close range.

The Pennsylvania Game Commission publishes inexpensive big 20 x 30 inch color charts of Pennsylvania birds, reproductions of which are included in this book.

The National Audubon Society, 1130 Fifth Avenue, New York 28, New York has several items of bird material which are inexpensive and obtain-

The late Reinhold L. Fricke, preparator at the Carnegie Museum, and chairman of the Game Commission's Board of Taxidermy Examiners for many years, prepares an educational display on the least bittern, collected in Crawford County.

Conservation of birds and the study of birds are often a part of the program of progressive sportsmen's clubs, like the Wilkinsburg Club, whose officers are shown here planning a program of education on birds of prey.

Photos by Hal H. Harrison.

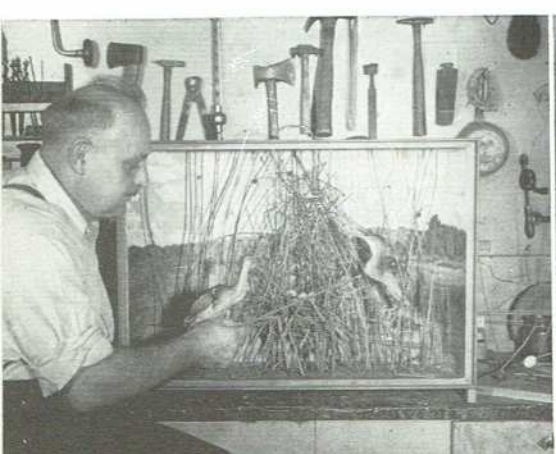


Photo by Hal H. Harrison.

House wrens are not always the "cute" little birds we think they are; some are pugnacious and even destructive of other birds.

able by sending name, address, price of item and additional postage if indicated. Here are some of them:

Colored post-card-size portraits from original paintings by Allen Brooks and Roger Tory Peterson with descriptive text on the reverse side. There are fifty cards in each of the four sets: Eastern summer birds, Eastern winter birds, Eastern spring birds and Western birds. They cost $1.75 per set with $.10 additional for postage on the Western bird set.

Picture post cards showing birds in color can be purchased from the Audubon Society for $.40 per set. There are three sets: Eastern Set A, Eastern Set B and Western Set. Each set contains ten bird pictures.

The Audubon Society also has slides and films for sale or rental. A complete listing of the Audio-Visual materials is contained in their catalog which costs twenty cents per copy.

There are many books and publications recommended for bird study which are listed on the following page:

Photo by Hal H. Harrison.
Building bird houses is another school activity that stimulates interest among children.

Photo by George H. Harrison
Teacher using Pennsylvania Game Commission bird charts for classroom study.

Books Suggested for Advance Study

A Field Guide to the Birds, by Roger Tory Peterson
Audubon Bird Guides (2), by Richard H. Pough
Handbook of Birds of Eastern North America, by Frank M. Chapman
Birds of Western Pennsylvania, by W. E. Clyde Todd
A Guide to Bird Watching, by Joseph J. Hickey
American Birds in Color, by Hal H. Harrison
The Book of Birds (2 vol.), The National Geographic Society
The Book of Bird Life, by Arthur A. Allen
Life Histories of North American Birds (set), by Arthur Cleveland Bent
The Audubon Guide to Attracting Birds, by National Audubon Society
Birds of America, by T. Gilbert Pearson
Ducks, Geese and Swans of North America, by F. H. Kortright
Birds and Their Attributes, by Glover M. Allen
Migration of Birds, by Frederick C. Lincoln
How Birds Live, by E. M. Nicholson
Natural History of the Birds of Eastern & Central North America, by Forbush and May

Periodicals for Pennsylvania Bird Watchers

Wilson Bulletin, a quarterly published by the Wilson Ornithological Society;
The Auk, a quarterly published by the American Ornithologists Union;
Audubon Magazine, a bi-monthly published by the National Audubon Society;
Cassinia, an annual, published by the Delaware Valley Ornithological Club;
Bulletins, published monthly, bi-monthly or quarterly by local bird clubs;
The Redstart, published quarterly by the Brooks Bird Club.

These young red-tailed hawks are protected. They will kill many mice.

Crows are valuable roadside scavengers. This one feeds on a fox squirrel.

hotos by Hal H. Harrison.

More than 50% of the bob-white's annual diet is weed seeds.

CHAPTER IV

BIRD CONSERVATION

Bird Conservation from a National Viewpoint

WHEN the early settlers first came to these shores there were plenty of birds, plenty of animal wildlife, plenty of forests. To these pioneers, the resources of the virgin land seemed inexhaustible. So they cut away the forests and ruthlessly slaughtered the wild creatures that abounded in them. And in a very short time many of the native birds and animals were threatened with extinction. Some far-sighted conservation-minded citizens began to be alarmed.

There were few early game laws. The first state law protecting birds was passed in New York in 1791. Twenty-seven years later, in 1818, Massachusetts passed a law forbidding the "wanton destruction of useful and profitable" species of birds. But these early laws, although they show that a few conservation-minded men had already realized the importance of birds to our national welfare, were probably not very strictly enforced. The slaughter of birds continued.

By around 1880 the situation became worse—much worse—when the ladies got into the act. Following the dictates of current fashion, they demanded hats made from bird feathers, hats decorated with bird feathers, and outer garments adorned with bird feathers. More birds than ever were being killed to meet this demand.

Something had to be done. The American Ornithologists Union took the first action against this senseless and terrible destruction of bird life. A committee was formed for the sole purpose of protecting the birds of North America. From this committee the National Audubon Society was incorporated in 1905.

But by this time public interest had been aroused to the extent that most of the states passed laws prohibiting the killing of game and other wild birds except during limited seasons.

It was a good start in the right direction, but to complete the reform, greater cooperation with foreign efforts was needed. This required Federal action. The result was the United States Statute of May 4, 1909, known as the Lacy Act, which prohibited the importation into the United States of any bird or animal declared by the Secretary of Agriculture to be injurious and forbade common carriers to handle or transport any such birds, animals or parts thereof, or any birds or animals killed in or shipped from any state or territory in violation of the laws.

Eight years after the American Ornithologists Union appointed its committee to try to stop the destruction of birds, C. A. Babcock, a school superintendent in Oil City, Pennsylvania, conceived a worthwhile idea—to educate the youth of the nation to appreciate and protect birds. To do this, he inaugurated the first Bird Day in the public schools of Oil City in May, 1894.

Two years later the U. S. Department of Agriculture, impressed by Babcock's movement and realizing the importance of birds to agriculture, urged all the schools to devote a special day to bird conservation.

The Federal Migratory Bird Treaty Act is our principal national law for the protection of birds. Signed by the United States and Great Britain in 1916, the treaty implemented by this Act provides for the protection of migratory birds in both the United States and Canada. It forbids all shooting of birds in spring and limits the killing of migratory game birds. No game season in any section may exceed 3½ months of a year.

In 1937 the United States signed a similar agreement with Mexico. Together these Treaties protect about 490 species of birds.

U. S. Fish and Wildlife Service

The most powerful agency for the welfare of American wildlife is the U. S. Fish and Wildlife Service of the Department of the Interior. Established on June 30, 1940, the Fish and Wildlife Service represents a merger of two older government agencies—the Bureau of Fisheries, established in 1870 and formerly a part of the Department of Commerce, and the Bureau of Biological Survey, established in 1885 and formerly a unit of the Department of Agriculture.

The U. S. Fish and Wildlife Service conducts extensive research into the lives and habits of wild creatures, provides Federal aid in wildlife restoration, establishes and maintains wildlife sanctuaries, and performs many other necessary functions in the conservation of the wildlife of the United States.

Bird Conservation in Pennsylvania

Birds in Pennsylvania are protected by both the State and Federal laws. The hunting of migratory birds is regulated by the U. S. Fish and Wildlife Service. A special Federal law imposes a maximum $500 fine for killing a bald or golden eagle. Other birds are under state supervision, and in Pennsylvania, all birds are given complete protection, except game birds during the supervised hunting season, and the following that are not protected at any time:

Crow	Sharp-shinned Hawk—part time protection
Bluejay	Cooper's Hawk—part time protection
European Starling	Goshawk—part time protection
English Sparrow	Snowy Owl
Kingfisher	Great-horned Owl

Bird protection is backed up by laws which are rigidly enforced, and for which proper penalties are provided.

For example, a fine of $25 is imposed on anyone who kills a wild turkey, ruffed grouse, quail, pheasant, partridge, woodcock, swan, wild goose or wild duck out of season.

A $10 penalty is evoked for killing any other kind of protected bird.

The law prohibits anyone from bringing into the Commonwealth any protected bird, or skin thereof, for the purpose of sale which is of the same family as those found in the wild state in Pennsylvania and imposes a $20 penalty for such violations. The fine imposed for possessing, destroying or collecting the nests, eggs or young of any other protected bird is $10 for each nest and each young. For destroying the nest of any game bird the penalty is $50 and for each young $25.

The laws which protect birds while they are alive has equal effect even after they are dead. Only a licensed taxidermist may prepare and mount birds and other animals.

Special permits are sometimes issued for collecting birds and their nests and eggs, but this privilege is limited to persons of known scientific attainment in the field of ornithology; to agents of public museums; and to teachers of ornithology within the public schools.

Work of the Game Commission

Upon the Pennsylvania Game Commission rests the responsibility for enforcing the Game Laws of the State. But this is just one part of a vast program of the Commission for the conservation of our natural resources, including our bird life.

The establishment and maintenance of refuges and sanctuaries by the Commission has been treated more fully under "Bird Refuges." The Commission's part in the feeding of wildlife has also been told.

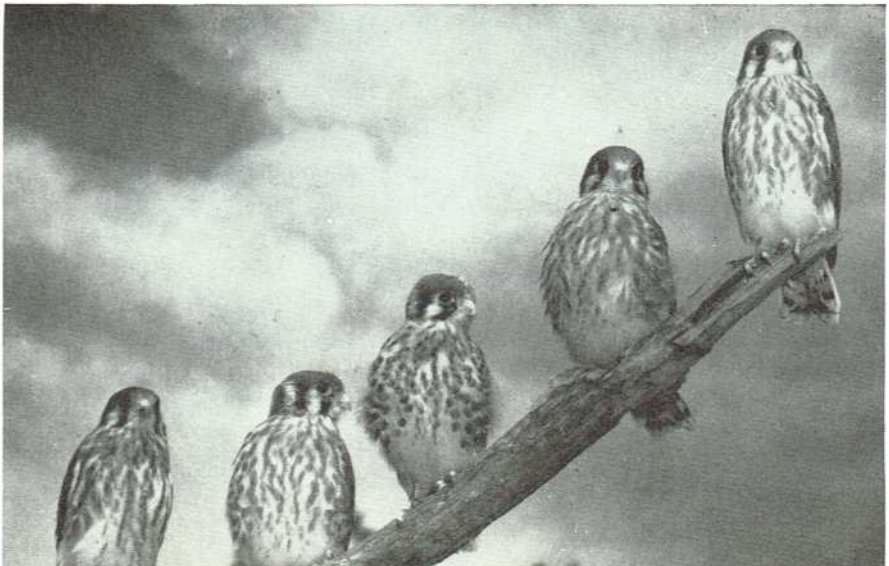
But one outstanding job being done by the Commission to promote the conservation of birds, is that of public education, a work not always recognized.

The publication of this booklet, sold at actual cost, is just one of the many projects of the Commission, handled through its Public Information Section. The publication of the six large color charts of Pennsylvania birds, painted by Ned Smith, has proved a most successful venture.

Through the pages of the Pennsylvania Game News, official monthly publication of the Commission, the gospel of bird conservation has been preached constantly for many years. Illustrated articles devoted to wild birds are almost monthly features in the "News."

Young sparrow hawks consume tremendous numbers of insects during the growing stage.

Photo by Hal H. Harrison.



Bird Refuges

In the establishment of refuges and sanctuaries man has some opportunity to make amends for destroying so much of the natural habitat of our native birds. The value of such undertakings, however, is in proportion to the amount of intelligent wildlife management that is applied to them.

Although it is true that some species of birds are everywhere, a sanctuary can be made so much more valuable to so many more birds if wise planning is undertaken. The "touch nothing" attitude of many well-meaning conservationists cannot possibly work for the good of as many birds as the application of certain tried and tested rules of wildlife management.

A dense planting of several acres of trees, unbroken by borders except those that surround it, will not attract many birds. The same acreage, with a few well-placed trails, roads, paths, or broken-up sections, providing more "edge" and less cover, will result in an immediate increase in the bird life.

The thinning of over-abundant trees, which are producing little or no bird food, and the planting of new species with high food value, is almost a guarantee of an increased bird life for the area.

In addition to its many game refuges spotted throughout the state, the Pennsylvania Game Commission manages the great Pymatuning Waterfowl Refuge in Crawford County. This refuge, 3,700 acres in size, is a mecca for bird watchers from many states. As a stop-over for waterfowl using the cross-country route, a tributary of the Atlantic Flyway, Pymatuning is a resting and feeding place for thousands of waterfowl annually. Many spring migrants remain to nest.

Another nationally-known refuge is the Hawk Mountain Sanctuary at Drehersville in Schuylkill County. This refuge, under the supervision of the Emergency Conservation Committee, is the first sanctuary in the world established primarily for the birds of prey. Spreading over 1,400 acres of mountain-top, this sanctuary attracts visitors from all parts of the world. From September until late November, thousands of hawks sail past the "Lookout" in an avian pageant unrivalled anywhere. In one day, over 11,000 hawks were counted passing along Kittatinny Ridge.

The Mt. Johnson Island Eagle Sanctuary on the Susquehanna River, Lancaster County, is another refuge that Pennsylvanians may be proud of. Under the direction of the National Audubon Society, this island is the first sanctuary ever established for the bald eagle.

Although not created primarily for the protection of bird life, all of our State and National Parks serve as refuges nevertheless. Birds are abundant in such public areas as Cook Forest State Park, Raccoon Creek State Park, Presque Isle State Park, Valley Forge, Gettysburg, etc. City Parks such as Fairmount in Philadelphia and Frick in Pittsburgh, serve the same purposes. Scattered throughout the State are hundreds of private bird sanctuaries. Some are just backyards; others cover many acres.

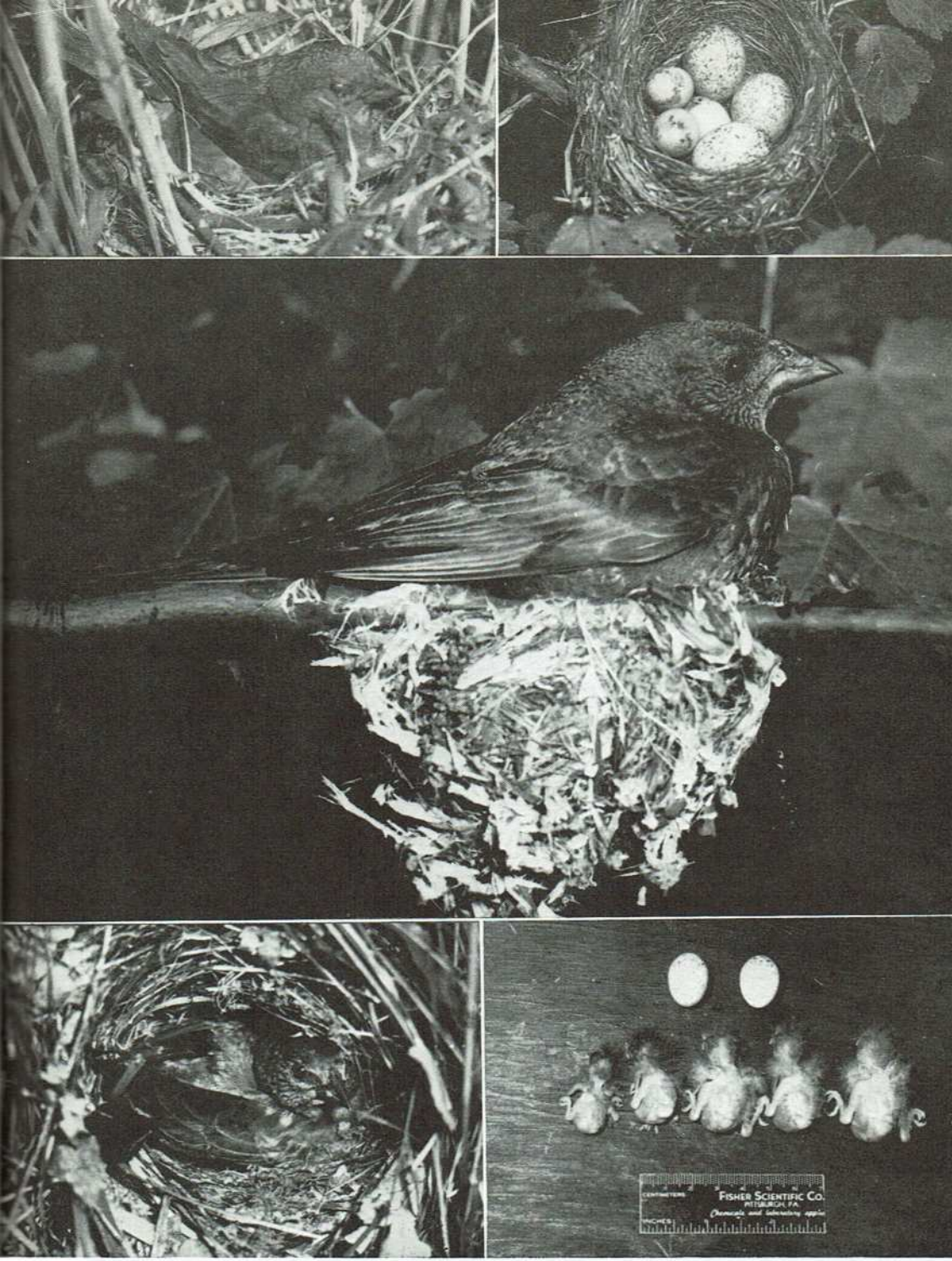


Photo by Hal H. Harrison.

Never-before-taken pictures of the parasitic cowbird: (Top left)—Cowbird laying her egg in the nest of a song sparrow. (Top right)—Three cowbird eggs in the nest of a chestnut-sided warbler with three of the host. (Center)—Cowbird laying her egg at dawn in the nest of a red-eyed vireo. (Bottom left)—Cowbird laying her egg in the domed nest of an ovenbird. (Bottom right)—Contents of an ovenbird's nest: two unhatched eggs of the ovenbird, two ovenbirds, left, and three cowbirds, right.

Controlling the Natural Enemies of Birds

In the normal balance of nature, the natural enemies of wild birds, such as storms, accidents, disease, starvation and predators, serve to keep their numbers in check and weed out the weak and sickly of the species. However, it is advisable to control some of these enemies.

Man is, of course, the birds' greatest enemy. Man's destruction of forests, plowing of fields, draining of swamps and marshes, accidental poisoning, fire, and in bygone years market hunting and dealing in feathers for millinery have taken a tremendous toll. The latter two have destroyed uncountable millions of birds. Laws for the protection of birds have greatly checked the depredations of man.

Cats are also major enemies of birds. It is instinctive for cats to kill birds, and a house cat, no matter how well cared for, sometimes likes to stalk and capture its own food. To guard against this ever-present menace, the bird lover has recourse to various devices which are guaranteed life insurance policies against the premature demise of his bird neighbors. The half wild, half starved cat is the worst enemy of all, for it is compelled to shift for itself, therefore the game and songbirds fall prey to its hereditary cunning. It is not unreasonable to believe that the average feral cat in a section often frequented by birds will kill from fifty to a hundred of our valuable feathered allies each year.

In Pennsylvania we now have over 85,000 occupied farms of three acres or more. Assuming there is one cat to every farm, and assuming each cat kills an average of fifty birds a year, it would mean an annual destruction of over 4,250,000 songbirds by rural cats each year in the Keystone State alone.

Winged predators likewise must be considered, but usually this menace is not to be found except in outlying districts. The average yard or garden sanctuary in borough or city is not often frequented by hawks and owls, but there is danger of molestation from them and other bird predators in rural communities.

Some mammals also are serious enemies of birds, as are the reptiles, particularly blacksnakes.

Birds are often their own worst enemies in that some species seek always to drive out other species. Here again your ingenuity in repelling the undesirables is most essential. English Sparrows and starlings rout other more desirable forms from the food counter, and their pugnacious tendencies incite them to fight not only among themselves but with other birds. Starlings are relentless in stealing and occupying the homes of more valuable cavity nesters.

Crows are definitely a menace during the nesting season, and that they eat a great many birds eggs and young birds is well-known. So does the bluejay. Likewise the bronzed grackle, red-headed woodpecker, and even the house wren may be accused of some damage to eggs or young of other desirable birds. Grackles, particularly, develop individualistic egg-eating habits which are culpable. This limited predation by native species has, of course, gone on for thousands of years and serious results are not probable.

The cowbird is an enemy of all smaller birds because it makes no nest. Mother cowbird lays her eggs in the nests of other birds and her young, being much larger, soon wax big and fat on the choice morsels brought to them by their unsuspecting foster mother.

Bird houses should be built to accommodate only the birds you want to use them. By keeping the entrance holes the proper size, sparrows cannot enter the wren house or starlings drive the martins and bluebirds away.

Crows are a menace when they are present in great numbers, and campaigns are waged against them in fall and winter by a great many sportsmen's organizations. Often some birds are caught alive, banded and released, and liberal rewards paid on their heads as an incentive for farmers and hunters to shoot more crows.

Use of Bird Dogs in Retrieving Cripples

The use of a hunting dog, when bird shooting, is invaluable. Many times a bird is hit but is not killed. A carefully trained dog is able to find and retrieve these cripples for the hunter. Without the dog, such injured birds would perhaps suffer before dying of their wounds or becoming prey to some predator.

CHAPTER V

THE GAME BIRDS OF PENNSYLVANIA

Upland Game Birds

Ringneck Pheasant—The ringneck pheasant is about the size of a leghorn chicken and will average about three pounds. The male has a long, pointed tail, the female has a shorter tail. The head and neck of the adult male is a glossy green with tufts on the sides of the head. About his neck is a white collar; his back and scapulars are golden yellow, the centers of the feathers glossy green; rump grayish, glossed with green and marked with black spots; wings light gray barred with black; tail brown barred with black and glossed with pinkish; breast rich copper red glossed with violet, the feathers tipped with black; sides golden yellow, spotted with glossy purple; bill and feet light gray, eyes bright yellow. The female and immature male are pale sandy brown and the head and neck have a pinkish cast. The entire upper parts are streaked and barred with dark brown and black, giving the bird an entirely different appearance and color pattern from that of the adult male. The eyes of the female and young male are brown.

The ringneck, a native of Asia, was introduced by the Game Commission into Pennsylvania in 1915, where it soon became a popular game bird.

Due to the restocking efforts of the Game Commission, the ringneck pheasant is becoming common in most parts of the Commonwealth, although it thrives best where there is intensive agriculture. Its favorite habitat is composed of grain fields, meadows, brushy fencerows, open marshes and old pastures.

The ringneck is a year-around resident of Pennsylvania. Mating takes place in the spring. The female makes her nest in a depression in the ground lined with grasses or other vegetation. The nest is usually placed in a field not far from a brush-line, stream or marsh. It lays 8 to 16 olive brown eggs. At hatching, the young leave the nest and follow the mother about in quest of food.

Ringnecks feed upon waste grains, weed seeds, insects (including grasshoppers, Japanese beetles and corn borers), fruits of shrubs and vines and various greens derived from native plants and farm crops such as clover.

For those farmers, sportsmen and naturalists who wish to improve the living conditions of the ringneck pheasant, here are a few suggestions. Standing field corn, soybeans and buckheat provide food and cover most desired by ringneck pheasants. Corn and soybeans should be planted in rows. During the winter when snows cover the ground and natural food is hard to find, feeding stations for ringneck pheasants and other birds should be established. A few corn shocks left standing at the edge of a field will also be helpful to wildlife during the winter.

Ruffed Grouse—The ruffed grouse, Pennsylvania's State Game Bird, is a pompous Don Juan, especially during courtship. He is conspicuous by his

ruffs and his broad, fan-shaped tail. The male and female are similar in size and color. The upperparts are principally reddish brown, irregularly marked with black, buff, gray and whitish. On the sides of the neck are ruffs of broad, black feathers glossed with greenish. The tail is reddish brown or gray or of intermediate shade, irregularly barred and mottled with black and a broad blackish band near the end and a gray tip. The throat and breast are buff and the rest of the underparts are white, tinged with buff and barred with black or dark brown. The female is slightly smaller than the male and usually has a shorter tail. An adult will weigh about 20 ounces.

The ruffed grouse is a permanent resident of Pennsylvania in the wilder wooded sections.

In the spring, the male grouse struts and drums at chosen spots in the woodland. He paces up and down on a log, ruffs lifted, wide tail fully spread and elevated. Sometimes he stands erect and, beating his chest rapidly with his wings, produces the drumming sound for which he is famous. Grouse drum in spring and fall, sometimes at night, but they do so chiefly during the mornings in spring. They make their nests on the ground, often at the foot of a tree, and lay 8 to 15 buff colored eggs.

The young leave the nest soon after hatching and develop rapidly. They can fly with ease when they are still quite small. In the winter, grouse develop long lateral scales on their toes which function as snow shoes. They are fond of wild grapes both for food and cover. In the summer, ruffed grouse eat many insects as well as fruits, nuts and berries. During winter they will eat buds of aspen, birch, beech, and maple. Grouse exhibit cyclic tendencies in regard to scarcity or abundance.

The ruffed grouse, Pennsylvania's State Game Bird, inhabits most of the wooded areas.

Photo Penna. Game Comm.

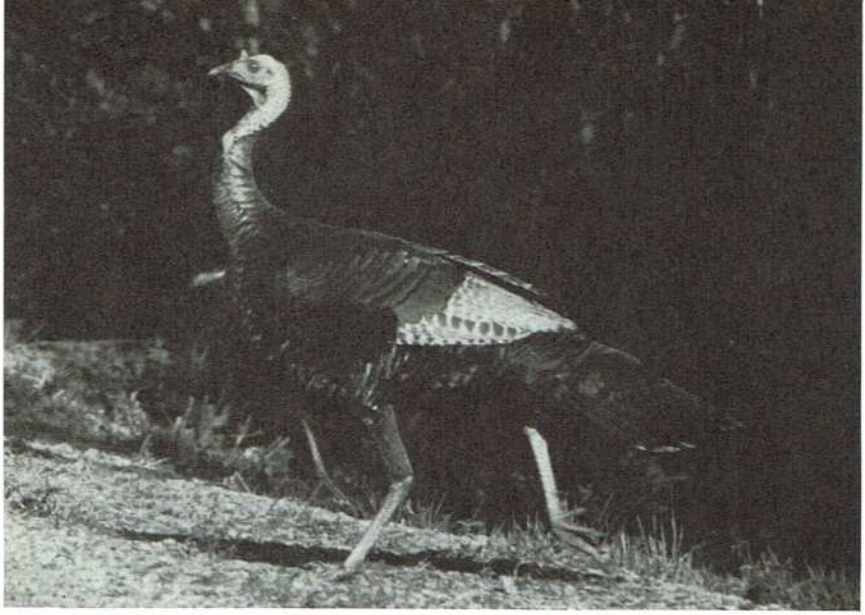


Photo by Donald S. Heintzleman.
Pennsylvania's wild turkeys have extended their range considerably.

Wild Turkey—The wild turkey is very similar to the domestic turkey in size and appearance except that the tips of the tail-feathers and upper tail-coverts are a rich deep chestnut; primaries are barred with black and white and the feet are pink. The rich, iridescent plumage, highly colored and wattled head and proud carriage make the wild turkey one of the most magnificent of birds.

Once fairly common thoughout Pennsylvania, especially in the southern mountainous counties, the wild turkey gradually became almost extinct. Forest fires, excessive hunting and encroaching civilization took heavy tolls of this great bird. The Game Commission recognized the need to replenish the stock and established a wild turkey rearing program. The propagation and restocking of wild turkeys proved successful over the years and now the wild birds can be found in almost every part of the state.

The habitat of the wild turkey is in woodland areas. Wild turkeys are very difficult to approach, for they are wary birds and have very keen senses. At the slightest warning they will run or fly. Unlike the flightless, clumsy barnyard species, wild turkeys can fly and are also swift runners.

Wild turkey hens make their nests on the ground, in a depression in the leaves, under brush, or in a thicket, usually well concealed from above. They lay 8 to 14 eggs that are buffy white to yellowish buff with small reddish-brown spots.

In summer wild turkeys eat much green forage and many small fruits and insects. In winter it is often necessary for them to scratch in the snow for beechnuts, acorns, wild cherries, dogwood fruit and other seeds.

In some districts wild turkeys have difficulty finding food in winter. Boy Scouts, sportsmen's clubs and others usually organize winter feeding programs to save wild birds from starvation during the cold months. Yellow corn is a favorite grain for winter bird feeding, as are black soybeans, because they contain Vitamin A which is lacking in some of the other grains. An adult turkey will average about 10 pounds, although many will weigh more.

Bobwhite Quail—This morning and evening whistler of our fields and woodlands was once very plentiful, but the severe winter of 1935-36 nearly wiped it off the face of our landscape. Bobwhite's head is blackish mottled with gray and red-brown. The throat, spots on the neck and a prominent line above the eye are white. The back and breast are mottled with gray, pinkish brown, buff, black and white. The scapulars are bordered with buff, while the rump and tail are gray. The belly is whitish, barred with black. The flanks are rusty red with feathers margined with white. The female is a little smaller than the male and lighter in color.

Like many other native birds, the bobwhite was exploited in the early days of this country. And because the bobwhite was delicious food, although small, it was hunted for the market. Around 1855 quail could be bought in the city markets, dead or alive, for about fifty cents a dozen. As early as 1838, two counties in Pennsylvania passed a law prohibiting the sale of quail in markets except during the open season. The law also forbade the destruction of nests and eggs. The first daily bag limit was established in 1897, but it was not until 1905 that a season limit was imposed.

The bobwhite quail is a common permanent resident of Pennsylvania and is found chiefly in the less mountainous counties and usually is more numerous in cultivated districts.

In late April or early May the first "bobwhite" calls may be heard. The birds mate about this time of year. They make their nests on the ground in high grass or among brush. The nest is made of dry grasses arched over with grasses or other vegetation. It is often placed along a road or at the edge of a field. There are 10 to 18 pure white eggs. During the mating and nesting seasons the birds live as a pair. In the fall the young and

Papa bobwhite quail at nest.

Photo by Bryant Tyrall.

adults of a family form the nucleus of a covey. To this group are added other individuals from other groups. They remain together during the fall and winter. When mating season arrives, the coveys break up for the summer.

Bobwhites eat a variety of food. Insects, berries, fruits and green vegetation are their main items of food. In fall and winter, bobwhites eat seeds and berries. They have been known to feed upon the berries of poison ivy, wild grapes, pokeweed, sumac, spice bush, corn, when left unhusked in the shocks and unharvested soybeans. Quail ordinarily feed twice a day, in the morning and in the evening. An adult will average about six ounces in weight.

Winter feeding is often important, as winter is a critical season and when there is snow, food is hard to find. Feeding stations for bobwhite quail should be close to escape cover because predators such as hawks soon find the feeding stations too. During the winter, there is an appalling lack of cover on farmlands. Shrubs, evergreens and thick vines such as honeysuckle should be planted along fencerows on farms.

Migratory Game Birds

Woodcock—The woodcock is a snipe-like bird with a very long straight (2½" to 3") bill, large eyes high on the head, and rather short legs. The

Woodcock on nest.
Photo by Mr. Burley, U. S. Fish and Wildlife Service.

sexes are similar in plumage; the female is larger than the male. The top of the head is black, crossed with buff colored bars. The upperparts are dark brown and black, the feathers barred, margined and speckled with buffy brown and gray. The wing coverts are buffy brown, barred with darker brown. The underparts are buff colored. The eyes (iris) are dark brown. The bill and the feet are dull gray to flesh color.

The woodcock comes to Pennsylvania only for the spring, summer, and part of the fall. It winters in the south. A very early migrant it often arrives late in February and early March and stays until the middle of November.

Woodcocks like swampy ground, so they are found along the borders of marshes, near streams where the low banks are always moist and where brush give this retiring species a retreat. Woodcocks are of nocturnal habits. In the marshes and swampy grounds they bore in the mud with their long bills in search of earthworms which they grasp with the mobile tips of their mandibles.

The spring courtship flight of the woodcock is remarkable. On warm evenings the males "peent" in their favorite haunts, then as darkness descends, they mount on whistling wings higher and higher until they are far above the earth. They then hurl themselves back and forth as they start pitching toward the earth, producing a twittering sound with their throats as they drop at considerable speed to alight not far from where they started.

A woodcock's nest is a mere depression in the leaves, usually in more or less open woodland, sometimes concealed from above by brush or a tree or bush. There are three to four buffy brown eggs spotted with darker brown. The young leave the nest when hatched.

The main diet of the woodcock is earthworms, grubs, beetles and other insects. An adult timberdoodle will average about eight ounces.

Mourning Dove—The mourning dove is a little larger than a robin, with a small head, and a long pointed tail. The crown is a clear gray, while the front of the head, face, throat and lower neck are a soft reddish brown. It has two small black spots back of and below the eye. The sides and back of the neck are gray with patches of iridescent feathers which reflect greenish, golden and purplish lights. The back and wings are grayish brown, some of the coverts and tertials with black spots. The rump and tail are gray, the outer tail-feathers noticeably tipped with white. The bill it black. The feet are reddish. The female is less brightly colored than the male.

The mourning dove is a common summer resident throughout the Keystone State. It arrives in late March and remains until November. Occasionally, when the ground is free of snow or when seed grain is plentiful as food, it stays during the winter.

Mourning doves make flimsy, flat nests of small twigs, weedstalks or other bits of vegetation. This nest is usually placed on a horizontal branch or in an ample crotch in an orchard tree or willow, often near a stream and usually not too far from the ground. Occasionally the nest is placed on the ground. It lays 2 white eggs twice or more during the season. The mourning dove is famous for its sad song.

These doves eat a great deal of weed seed. They have no destructive habits.

(See mourning dove on page 16)

Photo Penna. Game Comm.

Mallard and young.

Waterfowl

Migratory waterfowl such as ducks and geese have somewhat the same appearance as their domestic cousins although the coloring of different species varies and the wild waterfowl may differ a little in size, according to species.

Most of the migratory waterfowl are found along the larger waterways of Pennsylvania in the spring from March 1 to May 15 and in the fall from early October until around the middle of December. A few of them remain for the summer along streams, rivers or lakes.

Waterfowl find their food in or near water. They eat insects that occur in or near the water, grains and aquatic plants.

To attract waterfowl, there must be water, and there must also be the kind of food that waterfowl like. By planting around ponds or streams some of the plants mentioned later under the heading "Planting Food and Cover," it is possible to attract wild ducks and geese and other marsh birds.

Following are descriptions, etc., of some of our common waterfowl:

Mallard—The glossy green head of the mallard, ending with the white ring on its neck, readily identifies the commonest of our wild waterfowl. Other color markings include the gray back and wings, black rump and tail coverts, violet speculum bordered with black and white, whitish tail, rich glossy chestnut breast, and finely barred gray sides. It has a white belly, yellow bill and bright orange feet. The females are mottled and streaked all over with grayish brown, the bill is a dull greenish and the feet dull orange. Length 23 inches. The nest is a depression under a bush or in high grass, usually near water. It is lined with down. The eggs, which are from 6 to 15 are pale, greenish buff, glossy in appearance.

The mallard is one of our best known ducks and is the ancestor of several domestic strains of waterfowl. It is usually found in flocks along the shallow margins of streams where it procures its food by nibbling along

the bottom while its tail protrudes from the water. It is frequently observed on farm ponds, and generations of domesticated birds are found on the lakes of many city parks.

The white tail and orange feet of the male, which contrast with the gray back and wings, are good field marks to the bird student or hunter.

Black Duck—The black duck or black mallard occurs in two forms in Pennsylvania. The smaller duller black duck occurs as a migrant at about the same time as the mallard and nests locally. The red-legged black duck, a summer bird of Labrador, comes south later in the fall and has been known to occur in the northern part of the state until late December. It may occasionally winter when the water is free of ice.

The male and female black duck are similar in appearance. They are dark brown, darkest on the top of the head and on the back, all feathers margined with brownish buff. The cheeks are buffy, streaked with black; speculum a rich violet, bordered with black and, at tips of feathers, with white. The under-wing plumage is white, the bill greenish. In the black duck the feet are dusky but bright red in the red-legged species. Length 22 inches.

Both the mallard and black duck quack loudly like domestic ducks, particularly when they are surprised. Large, dark-colored ducks which show white under the wings as they fly off are likely to be black ducks. The immature female's speculum is noticeably grayish, with little green. Length 20 inches.

Pintail—This long-necked miniature swan-like duck is a common migrant. Most duck hunters refer to it as a sprig. The male in mating plumage, which is characteristic of the winter months, has a head of warm brown, glossed with violet; the back of the neck is blackish bordered with white stripes which run down the sides to the breast; a brownish gray back; black shoulders with white or buffy; brownish gray wings, the greater coverts of which are tipped with cinnamon; a green speculum bordered narrowly with white; black, long and narrow central tail feathers; white underparts; sides heavily marked with fine lines of black. The female has a blackish crown irregularly marked with rich brown; a white throat with sides of head and neck considerably streaked; a buffy breast spotted with blackish; feathers of sides margined and barred with dark brown and white; the under wing-coverts dark brown, bordered with whitish. The male in summer breeding dress resembles the female. Length, male 28 inches in full, long-tailed plumage; female 22 inches. Pintails are swift fliers and have the ability of rising straight into the air from a pond or from the ground.

Wood Duck—The male of the wood duck is thought by many to be the most beautiful American bird. It is little wonder that an Indian legend tells us that a little gray duck, while on the search for happiness, swam into the end of the rainbow and came forth the brilliant creature we now call the wood duck.

The head and crest of this Don Juan is rich, glossy green with violet and blue reflections; a line from bill over the eye, a line along side of crest, and other lines in flowing feathers of crest are white. The throat has a white band up to the cheeks and there is a wide band of white at the nape.

Photo by D. L. Bacheler.

Unusual photo of a mother wood duck about to leave her nest.

The breast and an area at either side of the base of the tail is chestnut, the breast spotted with white; a band on the breast in front of the wing white; sides are buffy, finely barred with black and white; back greenish brown; scapulars blackish, glossed with steel-blue and greenish; speculum steel-blue tipped with white; primaries tipped with greenish blue; tail blue-black; eyes red; bill dusky white and red; feet yellowish. In the female the area below and back of the eye and throat is white; the crown is brown glossed with purplish; sides of head ashy brown; breast and sides grayish, streaked and mottled with brownish; belly white; back olive brown glossed with greenish; the inner primaries are tipped with greenish blue. The immature resembles the adult female. The male in eclipse plumage, which he assumes during late summer, is similar to the female. Length 18½ inches.

The wood duck is almost as agile as a perching bird. They are cavity nesters and where natural homes are not available man-made homes should be provided. The young birds, when ready to leave the nest, clamber up to the entrance, teeter about uncertainly, then plunge to the ground which may be 15 to 20 feet below. Sometimes on the way down they even somersault, but seem to land unscathed, apparently none the worse for wear.

Wood ducks are fond of acorns and the seeds of many aquatic plants. The young birds, like the adults, are amazingly agile and run about like young chickens, bright-eyed, attractive, and so small as to make you laugh as they race into the water for a swim.

Redhead—The redhead and the canvasback, which will be discussed next, are comparable in many ways, but the high head and yellow eyes of the former distinguish the male redhead from the male canvasback. In the

redhead the head rises abruptly from the bill. Both sexes have a fluffy, round crest. In the male the entire head is bright rufous, glossed with purplish; the lower neck, all around, the breast and the upper back are blackish; the rest of the back and scapulars are finely barred with wavy black and white lines of equal width; wing-coverts brownish gray; wings gray without a noticeable speculum; upper and under tail-coverts black, belly white with lower belly more or less barred like the back; sides barred also as in back; eyes yellow; bill blue-gray. In the female the upperparts are dark grayish brown, darker on the wings; all feathers are more or less margined with buffy or ashy; neck buffy, somewhat mottled; breast and sides gray-brown, washed or margined with buffy; belly and under tail coverts somewhat suffused with buffy; eyes brown; bill blackish with blue gray band at end. Length 19 inches. Redheads are fairly common as migrants.

Canvasback—This bird has a sloping rather than a high forehead in that it rises gradually and almost imperceptibly from the bill. The white back of the male is noticeable at a distance. The head and neck of the canvasback is rufous, the chin and crown blackish. The lower neck, breast and upper back is black. The back and wing-coverts are barred with black and white, the white lines so much wider as to appear even at a distance, whiter than in the redhead. The belly is white and the sides are finely barred; upper and under tail coverts and tail are black; eyes reddish brown; bill blackish. In the female the head, neck, breast and upper back are light rufous; throat pale, the frontparts of head somewhat brighter;

Redhead.

Photo by Ralph Cady.

Photo by Donald S. Heintzleman.

Canvasback.

back grayish brown, feathers washed with wavy white lines which the female redhead does not have; belly white and sides grayish brown sometimes marked like back. Length 21 inches. A common and regular migrant.

Scaup—The two scaups or blue-bills or black heads as they are commonly called, are difficult to tell apart in the field. Identification depends upon the males for the females are very much alike. The male greater scaup's head shows greenish reflections whereas the lesser scaup's head is glossed with purplish reflections. Both are common as migrants. In the scaup the male's head, neck, breast, and upper back are black, the head having greenish reflections. The back and scapulars are barred with black and white; the speculum is white; the upper and under tail-coverts are black; the belly white, the lower portion and sides finely barred with black. The bill is blue gray; the eyes yellow. In the female there is an area around the base of the bill which is white; the head, neck, uper back and breast are dark brown, margined with buffy on the breast; the rest of the upperparts are somewhat lighter brown; the sides are brown marked with wavy white lines; belly and speculum white. Length 18½ inches. In the lesser scaup the male's head has purplish rather than greenish reflections, and the barring of the sides is stronger than in the greater scaup. The females of the two species are practically indistinguishable in the field. Length 16½ inches.

Ringnecked Duck—The ringnecked duck is fairly common as a migrant but less so than the scaups. In general appearance both sexes are similar to the scaups but differ in the following respects. In the male ringneck the chin is white; the head, which has a somewhat higher crest than either

scaup, is richly glossed with purplish blue; there is a rich brown collar about the neck; the back is blackish and the speculum is gray, not white; the female may be distinguished from the female scaups by the gray speculum. The head and neck of the female ringneck often has a mottled or spotted appearance. In both sexes the blackish bill, which is crossed near the tip with a whitish band, is an excellent field mark. Length 16½ inches.

Goldeneye—The goldeneye or "whistler" has a large head and a ludicrously short bill which are good field marks even at a considerable distance. The strongly contrasting black and white plumage of the male is not easily to be confused with that of any other species. The male has a black head, glossed with green. A white spot is conspicuous below and in front of the eye. The neck, the exposed part of the wing-coverts, the speculum and part of the scapulars and underparts are white; the rest of the plumage black. The eyes are yellow. In the female the head is brown, neck a little paler; the breast, back and sides gray; speculum and underparts white; eyes yellow. Length 20 inches. The musical whistling sound of their beating wings has been responsible for their common name whistler. The Barrow's goldeneye also occurs in Pennsylvania but is much rarer. The male has a purplish head and a somewhat crescent-shaped patch in front of and below the eye.

Bufflehead—Butterball or dipper duck are common names applied to this Dapper Dan. Like the male of the wood duck, he is a beautiful bird. Like the goldeneye both sexes have short bills and high rounded crests. The male has a black head, glossed handsomely with greenish, purplish, bluish and fiery orange. A large white band across back of the head from eye to eye is conspicuous. The lower neck, wing coverts, speculum, outer scapulars and underparts are white; the back and wings black. The lower back and the tail are grayish; the eyes are dark brown. In the female the head and upper breast are dull brown with a patch on either side of the head, speculum, breast and belly are white. Length 15 inches. Common and sometimes abundant as migrant. These ducks are good divers and can disappear at the wink of an eye. They eat much animal matter including small fish captured while diving. These ducks are often exceedingly fat and this tendency of plump roundness has given them the common name "butterball."

Old Squaw—Here's a handsome and noisy duck that demands attention wherever it is found. It is readily identified. It is usually a deep water feeder and is found rarely in the smaller ponds or along streams. Conspicuous on the male are very long, narrow middle tail feathers which are even longer than in the pintail; the female lacks this length adornment, however. In winter the sides of the male's head are washed with grayish brown; sides of back of head and upper neck are black, more or less margined with buffy; the rest of the head, neck and upper back, scapulars and lower belly are white; the black bill has a yellowish orange band across the end; the eyes are pale brown. In the female the upper parts are dark brown: the scapulars and back are more or less margined with grayish; the sides of head and neck are white or whitish; the breast is gray and the belly white. The male in summer has the sides and front

of head white; the rest of the plumage is chiefly black except the belly which is white. Length of male 21 inches; female 16 inches. The old squaw is an expert diver and its rapid flight will carry it along a few feet above the water at from 35 to 60 miles an hour, perhaps faster. It alights with a swish.

Ruddy Duck—Here is another dipper also referred to locally as butterball. Its stiff upturned tail is a decisive and comical field mark. Both sexes have thick necks, short upper tail coverts and stiff tails. The male has a black crown. Its cheeks and chin are white; the throat, neck and back are rich rufous; lower back and tail blackish; breast and belly silvery white; somewhat mottled along the sides; bill pale gray-blue; eyes black. In the females and immature birds, the upperparts are dark grayish brown, the feathers marked with narrow, wavy, buffy bars. The side of the head and upper throat are whitish; the lower throat and neck are grayish; and the underparts silvery white. Length 15 inches.

Ruddy ducks are expert divers but have difficulty at times rising from the water due to their comparatively small wings. As they get under way they patter with their great feet while their wings beat the water noisily. The neck of the ruddy duck is unusually large for a duck. The head may even be pushed back into the skin of the neck. In most cases the circumference of the neck is noticeably less than that of the head at its greatest diameter.

Gadwall—The gadwall is one of our rarer ducks and is considered an irregular migrant. It is smaller than the common mallard but has some conspicuous marks including the yellow feet and the white speculum which is noticeable even though the bird may be swimming. The male's head is topped with a low, fluffy crest mottled with rufous and black. The sides of the head and neck are buffy streaked and spotted with black. The breast and lower neck are black, each feather with a central spot and border of white which gives a remarkably beautiful scaled appearance. The back is gray-brown, the rump and upper and under tail-coverts black. Breast and belly whitish; sides finely barred with blackish. The lesser wing-coverts are chestnut; speculum white; the feet yellow. The female is similar but duller, with chest and sides buffy, thickly spotted with blackish. Underparts white, more or less spotted with black and with little or no chestnut on the lesser wing-coverts. Length 20 inches.

Like blacks and mallards, gadwalls feed in shallow water, frequently at night.

Baldpate—The baldpate or American widgeon is a common and sometimes an abundant migrant particularly along the larger streams. It cannot be mistaken for any other species because the white crown-patch of the male is a dead give-a-way. Not only has it given the bird its name, but it is an excellent field mark. The sides of the head back of the eye are glossy green spotted with black; the belly is white and the back is gray-brown finely barred with black; bill blue-gray. The head and neck of the female are pale buffy finely streaked with black; the breast and sides are dull pinkish brown, washed with grayish; the belly is white; wing-coverts are brownish-gray, their outer webs mostly or entirely white, the back is grayish-brown barred irregularly with buffy. The greater their tips black, sometimes edged with white. Greater underwing-coverts white. Length 19 inches.

Photo by Hal H. Harrison.

Baldpate.

Green-winged Teal—The teals are our smallest ducks. Their size and remarkably swift flight make them easy to identify except in foggy weather when the apparent size of the bird is likely to be misleading. The male has a head with a crest of flowing chestnut, an area around and back of the eye which is glossy green bordered below with a thin whitish line; chin black; upper parts gray finely barred with black; speculum green, bordered with black and buffy; middle under tail-coverts black, lateral ones creamy; breast and sides pinkish brown finely barred with black with a white bar on the side of the breast. The belly is white or buffy, spotted sometimes irregularly with blackish. In the female the top of the head is blackish edged with rufous; sides of head and neck white, heavily streaked with black; upperparts blackish, all feathers margined with buffy. The wing has a green speculum as in the male; underparts considerably *mottled*, not barred as in male. Length 14½ inches.

The green-wing feeds like the mallard and black duck by tipping in shallow water and plucking food from the bottom.

Blue-winged Teal—A trifle larger than the green-wing, and about as common during migration. Sometimes it may nest in marsh areas. The head of the male is dark blue-gray with violet reflections; the crown is dark brown; chin and sides of base of bill blackish, there is a cresent-shaped patch of white in front of eye; the back is brown barred and mottled with black; the breast is white, buffy or rusty, heavily spotted with black; lesser and middle wing-coverts gray-blue, forming a conspicuous color area, particularly in flight; speculum glossy green. In the female and immature the crown is dark brown, irregularly streaked with grayish; the sides of head and neck grayish are streaked with black; throat whitish, breast and belly usually whitish, spotted and margined with blackish; speculum glossy green. Length 16 inches.

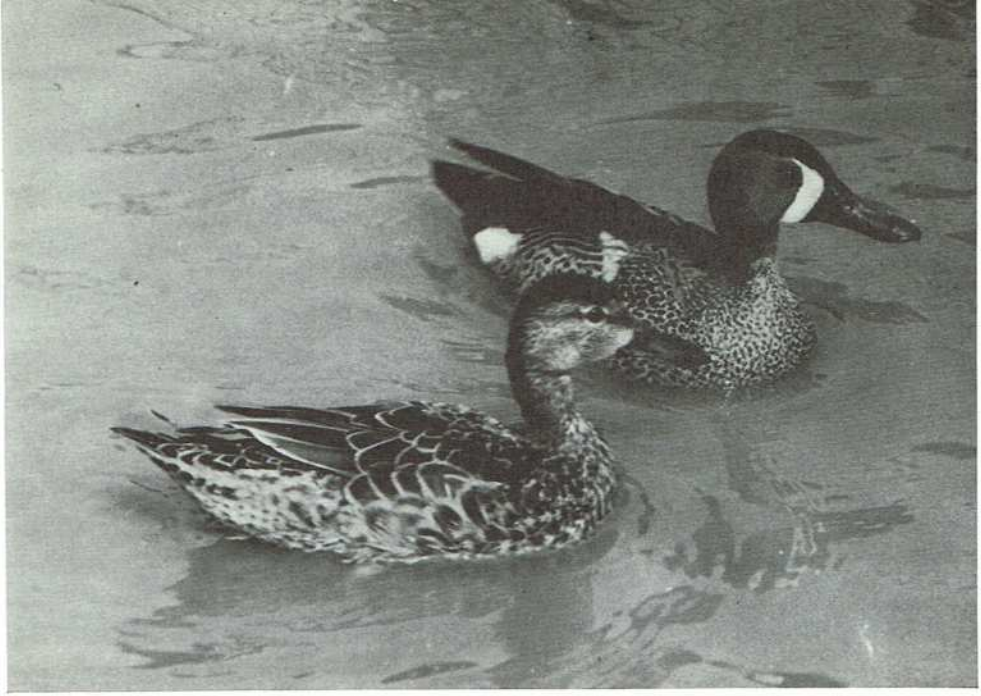


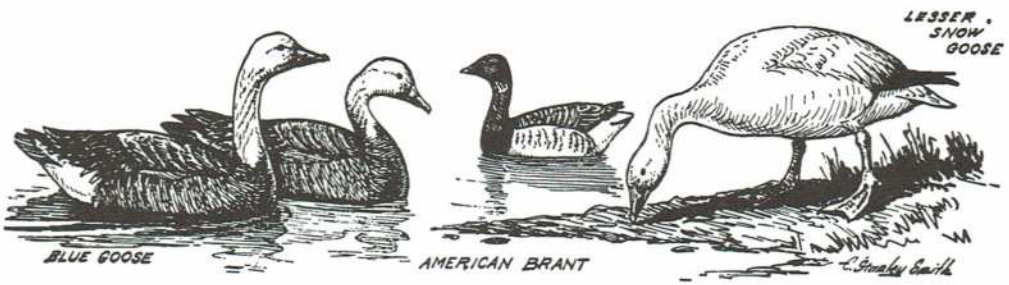
Photo by Maslowski and Goodpaster.

A pair of blue-winged teal.

The blue lesser wing-coverts of the blue-wing are fairly easy to recognize even at a considerable distance.

Shoveller—The huge shovel-like bill of this species is responsible for its name and will distinguish it in any plumage. So will its blue wing-coverts which have much the appearance of those of the blue-winged teal. The shoveller is a little smaller than the mallard and black duck but larger than the teals. The bill is very large and broad and is noticeable even at considerable distance in the field. The male has a head and neck of rich black glossed with green and violet; a dark brown line extends down the back of the neck and back; the belly and sides are rich chestnut; lesser wing-coverts gray-blue; speculum green, upper and under tail coverts black, eyes yellow; feet pink. The head and neck of the female is streaked with black and buffy bars; the throat and underparts are buffy with feathers margined and spotted with dark brown and buffy; feet orange-pink, paler than in the male; eyes brown; bill greenish yellow, blotched with brownish.

Canada Goose—Whenever we hear the honkers in the spring and watch their V-shaped flights we know that winter is breaking up; conversely in the fall we know that the cold season is upon us. They are reliable weather barometers. But more than that they are symbols of American conservation. Strikingly handsome, they are about the size of a domestic goose but far more dignified. The sexes are similar. The head and neck are black, with a broad white band under the eye and across the throat; the upperparts are bluish gray, the feathers margined with a lighter shade, giving a somewhat scaled appearance; breast and sides gray brown, more or less as in the back; belly white; rump and tail black; upper tail-coverts white. Feet and bill black; eyes dark brown. Length about 3 feet. Canada



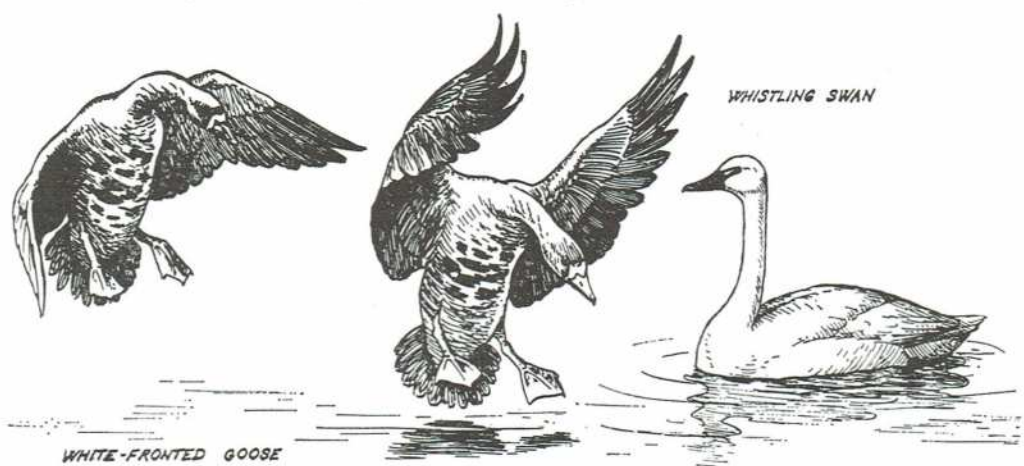
geese migrate both by day and night but they are noticed at night more often than by day because in the comparative stillness of the night their loud musical bugling drifts clearly down to us as their great bodies speed along at about 60 miles an hour. We are literally held spellbound by their coming and their passing. Unlike the ducks, geese are not so aquatic in their habits. Large flocks often descend to the fields where they feed upon grass or sprouting grain.

Greater Snow Goose—Sometimes this great white bird with its black wing-tips flies across Pennsylvania. It has been recorded a few times in huge flocks. The white-fronted goose, a gray goose with a white area at the base of the bill, black spots on the belly, and yellow feet, occurs rarely.

Brant—Smallest of our geese, and similar to the Canada goose, but with only a suggestion of white band on the neck; occurs rarely. It is a maritime species not often noted inland.

Whistling Swan—The whistler is one of the largest and most graceful birds. One of the rarest sights to behold is that of a flock taking off, hanging close to the water until sufficient momentum is gained to take them gracefully aloft. Their wing-spread sometimes is as much as 6 to 7 feet. The sexes are similar. The adults are pure white, the bill and feet are black, and a small yellow spot is noticeable at the base of the upper mandible just in front of the eye. The eyes are brown. Young birds are pale brownish gray in color, usually darkest on the head and neck. As the immature plumage is replaced by the adult plumage, a vague mottling appears. Length about 4½ feet.

Trumpeter Swan—Always a very rare bird in the eastern United States, the trumpeter is even larger than the whistling swan. The bill of this species is entirely black, lacking the yellow spot which is characteristic of the adult whistling swan and being of a different shape.



Merganser—The merganser, one of three including the red-breasted and hooded, are expert fishermen and like to inhabit swift water. They dive easily and their saw-tooth bills help them to hold their slippery prey. They are frequently called shelldrakes or fish ducks. The merganser is one of our largest ducks. The bill is long and narrow with teeth on both mandibles. The head and upper neck of the adult male is greenish black; the lower neck, patches in the wings, and underparts are white. The belly is suffused with salmon pink, particularly noticeable in some individuals. The back, shoulders and wings are black; rump and tail gray; bill and feet red; eyes bright red. In the female the head is adorned with two large crests; the head and neck both are rich brown, marked with white areas in front of eye and on chin and upper throat; upperparts ashy gray; patch in wings and breast and belly white. Length 25 inches. The merganser is a fairly common migrant along the larger waterways and smaller streams. It frequently occurs in winter when the water is free of ice.

Red-breasted Merganser—The red-breasted merganser is a fairly common migrant along the larger waterways, but is less frequently seen along the smaller streams. In this species the male has a long, graceful crest of fine feathers; the female a double crest as in the female merganser. It is difficult to distinguish the females of the two species except in the merganser the white area on the chin and upper throat is sharply defined, whereas in the present species the chin and throat are *not* white, but of a brownish color, paler than the rest of the head. The head and upper neck of the male red-breasted merganser is glossy greenish black; lower neck, patch on upper chest, and patches on wing and underparts white; back black; rump and tail grayish. The breast is reddish brown, mottled with black. The sides are marked with a striking *double row* of black and white feathers; the legs, feet and eyes are red. In the female the head and neck are rufous brown, grayish on crown and crest; throat *not* white, but of *paler brown than rest of head;* back grayish, washed with brown; underparts white; the sides marked with brown; bill and feet brownish; base of lower mandible reddish; eyes brown. Length 22 inches.

Hooded Merganser—The male hooded merganser is one of our most striking birds and cannot easily be confused with any other species. It is fairly common and regular as a migrant. The male has a black head, neck, back and tail. A high, fan-shaped crest which adorns the head is strikingly marked with white; the speculum is white; the sides rufous, finely barred with black; breast and belly white; eyes bright yellow. The female's head is dull brown, somewhat brighter on the thin crest, and grayer on the head and neck; upper throat, belly and speculum white; eyes brown. Length 18 inches.

The hooded merganser may be found along a quiet stretch of small stream where the handsome males, while resting, do not display their high crests. In this attitude the head has much the appearance of that of the other species of fish duck—thin, long and snake-like. When rising the birds beat their wings with amazing rapidity, the white speculum in the wings flickering brilliantly. This species is not often found in swift water as are the other mergansers.

Hooded Merganser.

Photo by Donald S. Heintzleman.

American Golden-eye.

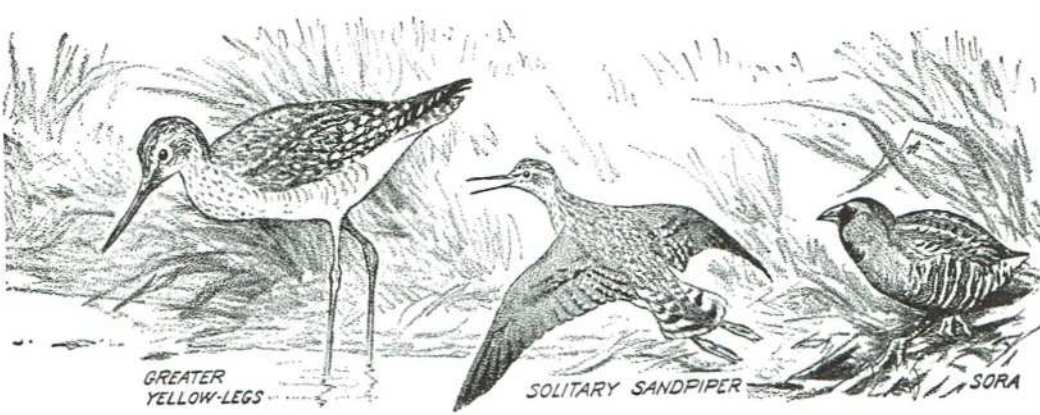
Photo by Donald S. Heintzleman.

Marsh Birds

The marsh birds in Pennsylvania are summer residents only. Most of them arrive sometime between mid-April and early June and leave between August and October. There are marsh birds found in all parts of the state along large and small waterways, ponds, lakes and marshes. Most of the marsh birds build their nests on the ground in marshes or near waterways. These nests are usually shallow depressions lined with dead marsh plants and surrounded by tall marsh grasses. Most marsh birds have longer bills than other birds for securing their food and longer legs to enable them to walk about in swamps and shallow water. They eat small fish, water insects and aquatic plants and their seeds. Under the heading "Planting Food and Cover" there are suggestions for types of aquatic plants that can be grown to attract these birds to private ponds and waterways.

Sora Rail—The sora rail is about the size of a starling and has a rather short bill. It is fairly common and regular as a migrant and can be found as a summer resident wherever marshes furnish it a nesting-site. Its nest is a crude cup made of dead cat-tail leaves or grass, arched over and well concealed by surrounding marsh vegetation. It lays 8 to 16 buff colored eggs spotted with brown. It is a weak-winged bird and often flies very low during migration.

Virginia Rail—The Virginia Rail is about the size of a robin. It is a fairly regular but uncommon summer resident except in certain localities from April 15 to September 30. It nests only in marshy places where it lives among cattails and other aquatic plants. Its nest is composed of cattail leaves or grasses made in a cup and placed at the base of water-plants on the ground or a short distance above the water, usually well sheltered from above, sometimes by a canopy of cattail leaves arranged by the parents. The eggs are buffy white spotted with dark or reddish brown and there are 6 to 11 in a nest. The Virginia Rail emits strange pig-like grunts and squawks, bewildering to those who hear it. Virginia Rails are seldom seen by casual observers.



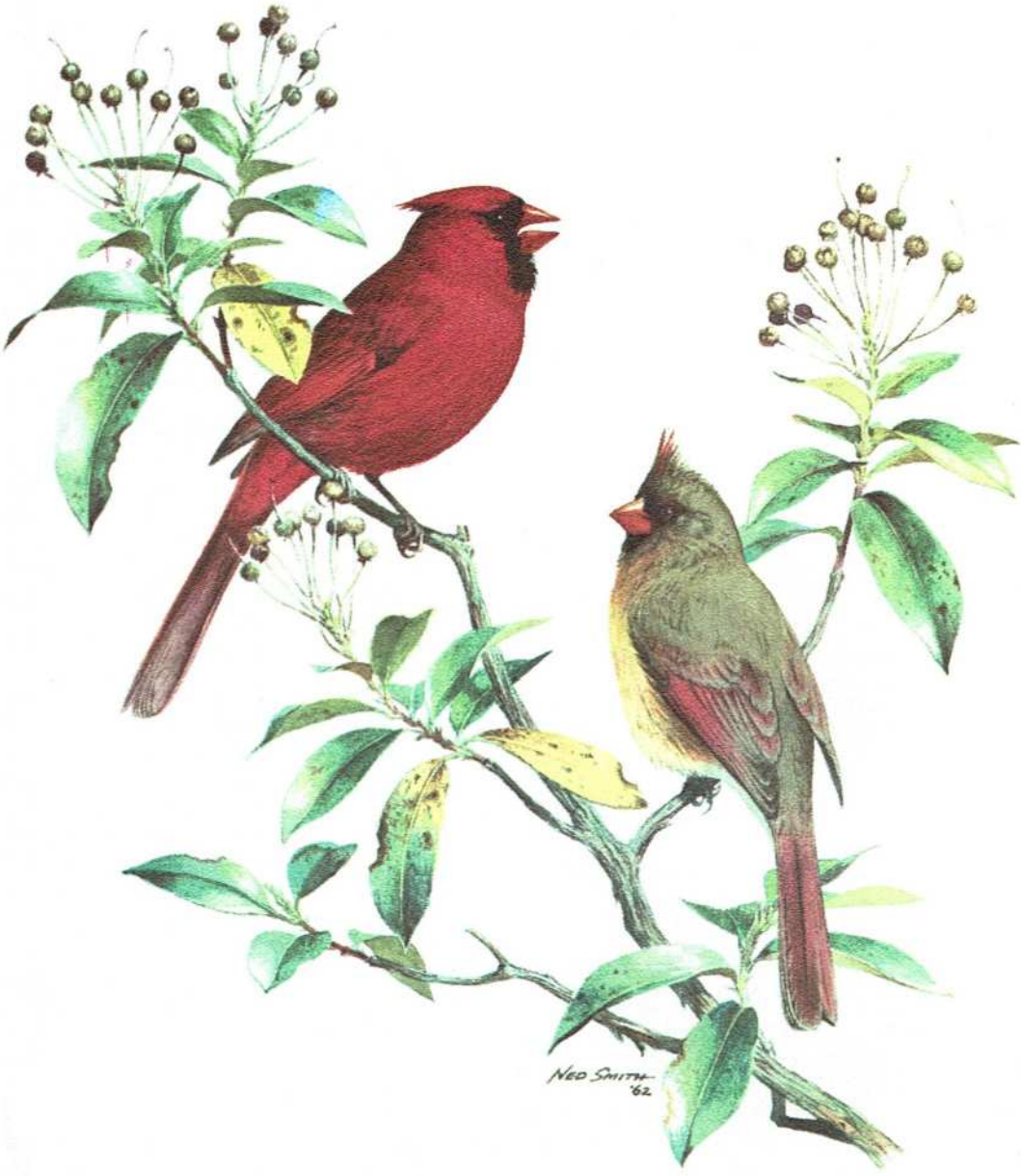
The Sandpiper

Across the narrow beach we flit,
  One little Sandpiper and I,
And fast I gather, bit by bit,
  The scattered driftwood bleached and dry.
The wild waves reach their hands for it,
  The wild wind raves, the tide runs high,
As up and down the beach we flit,—
  One little sandpiper and I.

Above our heads the sullen clouds
  Scud black and swift across the sky;
Like silent ghosts in misty shrouds
  Stand out the white lighthouses high.
Almost as far as eye can reach
  I see the close-reefed vessels fly,
As fast we flit along the beach,—
  One little sandpiper and I.

I watch him as he skims along,
  Uttering his sweet and mournful cry.
He starts not at my fitful song,
  or flash of fluttering drapery.
He has no thought of any wrong;
  He scans me with a fearless eye:
Staunch friends are we, well tried and strong,
  The little sandpiper and I.

Comrade, where wilt thou be to-night
  When the loosed storm breaks furiously?
My driftwood fire will burn so bright!
  To what warm shelter canst thou fly?
I do not fear for thee, though wroth
  The tempest rushes through the sky:
For are we not God's children both,
  Thou, little sandpiper, and I?



CARDINAL

Male Female

RED-WINGED BLACKBIRD

Male Female

WATERFOWL

1. Green-winged Teal
2. Black Duck
3. Blue-winged Teal
4. Baldpate
5. Pintail
6. Wood Duck
7. Mallard (Female)
8. Mallard (Male)
9. Canada Goose
10. Whistling Swan
11. Shoveller
12. American Goldeneye
13. Redhead
14. Canvasback
15. Lesser Scaup
16. Ring-necked Duck
17. Old Squaw
18. Bufflehead
19. White-winged Scoter
20. Hooded Merganser
21. American Merganser
22. Red-breasted Merganser
23. Ruddy Duck

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MARSH AND WATER BIRDS

1. Herring Gull
2. Ring-billed Gull
3. Tree Swallow
4. Belted Kingfisher
5. Black-crowned Night Heron
6. Green Heron
7. Great Blue Heron
8. Coot
9. Horned Grebe
10. Pied-billed Grebe
11. American Bittern
12. Common Egret
13. Red-winged Blackbird
14. Long-billed Marsh Wren
15. Wilson's Snipe
16. Lesser Yellowlegs
17. Solitary Sandpiper
18. Spotted Sandpiper
19. King Rail
20. Sora

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BIRDS OF PREY

1. Bald Eagle
2. Golden Eagle
3. Turkey Vulture
4. Great Horned Owl
5. Pigeon Hawk (Merlin)
6. Sparrow Hawk (Kestrel)
7. Duck Hawk (Peregrine)
8. Osprey
9. Long-eared Owl
10. Screech Owl
11. Screech Owl
12. Saw-whet Owl
13. Red-shouldered Owl
14. Barn Owl
15. Red-tailed Hawk
16. Broad-winged Hawk
17. Barred Owl
18. Goshawk
19. Sharp-shinned Hawk
20. Marsh Hawk
21. Snowy Owl
22. Short-eared Owl
23. Cooper's Hawk

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WINTER BIRDS

1. Ruby-crowned Kinglet
2. Golden-crowned Kinglet
3. Pileated Woodpecker
4. Red Crossbill
5. Downy Woodpecker
6. Hairy Woodpecker
7. Pine Grosbeak
8. Pine Siskin
9. White-winged Crossbill
10. Tufted Titmouse
11. Blue Jay
12. Brown Creeper
13. Black-capped Chickadee
14. Purple Finch
15. Red-breasted Nuthatch
16. White-breasted Nuthatch
17. Starling
18. Evening Grosbeak
19. Crow
20. Northern Shrike
21. Cardinal
22. Tree Sparrow
23. House Sparrow
24. Redpoll
25. Horned Lark
26. Snow Bunting
27. White-throated Sparrow
28. Slate-colored Junco

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BIRDS OF FIELD AND GARDEN

1. Barn Swallow
2. Purple Martin
3. Chimney Swift
4. Baltimore Oriole
5. Catbird
6. Brown Thrasher
7. Mockingbird
8. Ruby-throated Humming Bird
9. Yellow Warbler
10. Purple Grackle
11. Yellow-billed Cuckoo
12. Mourning Dove
13. Indigo Bunting
14. Kingbird
15. Yellow-shafted Flicker
16. Goldfinch
17. Phoebe
18. Yellowbreasted Chat
19. Song Sparrow
20. Bluebird
21. House Wren
22. Meadow Lark
23. Field Sparrow
24. Bobolink
25. Bobwhite
26. Ringneck Pheasant
27. Robin
28. Chipping Sparrow
29. Killdeer
30. Yellowthroat

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NED SMITH

BIRDS OF THE FOREST

1. Rose-breasted Grosbeak
2. Red-eyed Vireo
3. Black-throated Green Warbler
4. Raven
5. Cedar Waxwing
6. Black-throated Blue Warbler
7. Cerulean Warbler
8. Black-and-white Warbler
9. American Redstart
10. Myrtle Warbler
11. Red-breasted Woodpecker
12. Crested Flycatcher
13. Magnolia Warbler
14. Scarlet Tanager
15. Ovenbird
16. Chestnut-sided Warbler
17. Hooded Warbler
18. Kentucky Warbler
19. Ruffed Grouse
20. Hermit Thrush
21. Wild Turkey
22. Wood Thrush
23. Veery
24. Towhee
25. Woodcock

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To a Waterfowl

By William Cullen Bryant

Whither, midst falling dew,
While glow the heavens with the last steps of day,
Far through their rosy depths dost thou pursue
Thy solitary way?

Vainly the fowler's eye
Might mark thy distant flight, to do thee wrong,
As, darkly painted on the crimson sky,
Thy figure floats along.

Seek'st thou the plashybrink
Of weedy lake, or marge of river wide,
Or where the rocking billows rise and sink
On the chafed ocean-side?

There is a Power whose care
Teaches thy way along that pathless cost—
The desert and illimitable air—
Lone wandering, but not lost,

All day thy wings have fanned,
At that far height, the cold, thin atmosphere;
Yet stoop not, weary, to the welcome land,
Though the dark night is near.

And soon that toil shall end;
Soon shalt thou find a summer home, and rest,
And scream among thy fellows; reeds shall bend
Soon o'er thy sheltered nest.

Thou'rt gone; the abyss of Heaven
Hath swallowed up thy form; yet on my heart
Deeply hath sunk the lesson thou has given,
And shall not soon depart.

He, who from zone to zone
Guides through the boundless sky thy certain flight,
In the long way that I must tread along,
Will lead my steps aright.

Wilson's Snipe—This bird is a little heavier than a robin with a short tail, very long bill and moderately long feet. Its plumage is edged, barred and variously marked with white, buff and grayish. As a migrant it is regular and common in Pennsylvania, particularly in suitable marshes or along the margins of streams from March 15 to May 20 and from September 15 to November 10. It can be found as a summer resident in Pymatuning Swamp, Crawford County and other northern counties where there are suitable marshes. Its nest is a shallow cup made of dead stalks of various plants, placed on a small island or water-soaked log or in a low, moist field among the grass. It lays 4 olive-brown eggs spotted with rich dark brown.

Gallinule—The Florida Gallinule is smaller than a crow and has a bill of medium length. It looks somewhat like a coot. It is a rather rare migrant to Pennsylvania during mid-spring and early fall. As a summer resident, it is rare and local. Its nest is a crude cup of dead cattail leaves placed on the ground or above the water, among water plants. It lays 3 to 10 buff-colored eggs finely spotted with brown. Its call-notes are rather chicken-like.

Photo Penna. Game Commission.

Floating islands are characteristic of the Pymatuning Waterfowl Sanctuary.

Photo by Karl Maslowski.

Upland plover at nest.

Shorebirds

The shorebirds are not, as a rule, common in Pennsylvania. There are not many extensive mud flats in the Keystone State where they may feed and many of the streams are unsuitable habitat. Some of the more common species, such as the spotted standpiper, can be found throughout the Commonwealth along small streams, creeks and ponds that offer proper food. Erie and the Pymatuning Swamp are the two favorite spots of all birds in Pennsylvania.

All of the shorebirds are migrants, appearing in Pennsylvania between mid-April and October. They are ground nesters and find their food near the water.

Some Thumbnail Sketches of Shorebirds Found in Pennsylvania

Spotted Sandpiper—Teeter-tail, as he is often referred to, is a fairly common summer resident throughout Pennsylvania from mid-April until late September. It is found along all small streams, sometimes even in the mountains and heavily wooded districts. It is our best known shorebird. It is larger than an English sparrow with long, narrow, pointed wings. Its upperparts are brownish gray with a faint greenish gloss, more or less barred with black. Its face and underparts are white, spotted throughout with black. It nests on the ground, often near a stream, sometimes in a field. The nest is made of dead weed-stalks and lined with finer materials. It lays 4 eggs, whitish to brownish buff, irregularly and sometimes heavily spotted and blotched with reddish brown, usually about the larger end.

Killdeer—A widely distributed migrant and summer resident from mid-March to mid-November, occasional in winter. It is the size of a robin. Its forehead, patch over eye, throat, ring around neck and underparts are white. The breast is crossed by two prominent black bands. The forepart of the crown and line from bill under eye are blackish. The rest of the head and upperparts are grayish brown with greenish reflections. The tail is rufous. It nests in a depression in the sod or among gravel, sometimes rather carefully lined with pebbles or bits of debris. It lays 4 eggs whitish to buffy brown, heavily spotted with dark or reddish brown. The striking markings and clear whistle cry "kill-deer, kill-deer" make this one of our most easily identified birds. Although it searches for food along the water's edge, it often builds its nest some distance away.

Yellow-legs—There are two species of yellow-legs, the greater yellow-legs and the lesser yellow-legs. Both of these shorebirds are fairly common migrants to Pennsylvania and can be found at small pools and larger bodies of water throughout the Commonwealth from mid-April until May and from early August to mid-October. The greater yellow-legs is larger than a robin with very long yellow legs and a long, straight, slender bill. The upperparts are black; head and neck streaked with white; feathers of the back spotted and barred with whitish; underparts white, breast spotted and sides barred with black. The lesser yellow-legs looks much the same except that it is noticeably smaller.

Wading Birds

The wading birds, such as the great blue heron, little blue heron, bittern, American egret, green heron and black crowned night heron, are

Photo by Karl Maslowski.

Killdeer on eggs.

American egret at nest.

Photo by Maslowski and Goodpaster.

summer visitors to the Keystone State along the waterways. They can be found mostly in the eastern, southeastern and northwestern counties, although a few of them can be seen along waterways throughout the Commonwealth.

Herons, unlike other aquatic birds, build their nests high in trees near the water. Their favorite foods are fish, frogs and other amphibians.

Wading birds are easily identified by their unusually long slender legs, long bills and long necks.

Some Thumbnail Sketches of Wading Birds Found in Pennsylvania

Great Blue Heron—A common summer resident along all waterways; irregular and local as a nesting species, however; usually found in colonies, a number of which are located at the Commission's waterfowl sanctuary near Linesville, Crawford County. The birds arrive in mid-March and remain until late October. They have been noted irregularly during winter. The great blue heron is a large bird, measuring about 4 feet in length. Its plumage is mostly blue gray; center of crown and throat white; side of crown and nape black, where long, black feathers form a considerable crest. In Pennsylvania, the great blue heron usually, if not always, nests in trees; the nest is a huge, sprawling affair made of long sticks and placed high in a tree which, alive, becomes dead as a result of the droppings from the birds. It lays 3 to 6 pale blue eggs.

American Egret—A common midsummer wanderer, found chiefly in the southeastern counties of Pennsylvania where it may occur in some numbers during July and August. It stands about 3 feet high and is pure white with a black-tipped yellow bill, yellow eyes and black feet.

Green Heron—A common summer resident from April 10 to September 30. It is to be found throughout the Commonwealth along small streams and ponds. It is a small bird, about 17 inches in length. The crown, crest and line below the eye are black, glossed with green; throat whitish; neck reddish brown; back with plume-like feathers, blue green. The wing coverts and tail are green. It makes its nest of sticks, placed together as a shallow platform from 6 to 30 feet from the ground in a bush or tree. It lays 3 to 6 pale blue eggs. Green herons sometimes nest in small colonies, but in Pennsylvania are more frequently found in solitary pairs.

Black-Crowned Night Heron—A summer resident, locally abundant in eastern and southeastern Pennsylvania, where colonies occur along the Susquehanna and Delaware Rivers; in western Pennsylvania the species nests in the Pymatuning area in large numbers. It arrives at its nesting grounds in late March or early April and remains until October. This bird is larger than a crow and has an unusually heavy, blunt bill for a heron. The neck is usually drawn in, though it is of considerable length. The forehead, neck and underparts are white, somewhat grayish on the neck. The crown, upper back and scapulars are black, glossed with green. There are two or three long white plumes on the back of the crest. Wings, tail and lower back are clear gray; legs and feet yellow; bill dusky with yellowish green base; eyes red. It nests on a platform of sticks, usually placed high in a tree. Many nests, sometimes hundreds of them, are placed together in a favorite grove which is usually near a lake or on an island in a river. It lays from 3 to 6 pale blue eggs.

Photo by Karl Maslowski.

Immature Cooper's hawk.

CHAPTER VI

NON-GAME BIRDS OF PENNSYLVANIA

Hawks

There are 22 species of hawks in Pennsylvania nearly all of which are beneficial to agriculture in one way or another. They include four groups, namely, the Accipiters, the Buteos, the Falcons and the Harriers. The Accipters include the goshawk, Cooper's and sharp-shinned hawks. These are the pursuit ships among the winged predators, as contrasted to the slow-moving Buteo bombers. In addition to the speed which their short wings and relatively long tails gives them, this combination also affords the maximum in maneuverability, as anyone who has seen them pursue their prey through forested coverts may well recall. Normally these birds employ the same type of flight which has created for them the common name "darters." Swinging in wide circles through their favorite haunts, the forests, they suddenly break into an extended period of wing flapping. A hawk observed sailing, then flapping, sailing, etc., in cross country flight will likely prove to be one of these three species.

The Buteos, or soaring hawks including the red-tailed, red-shouldered, broad-winged and rough-legged comprise another group which fly in the same manner, have similar body lines, eat similar foods. These hawks have long, broad wings and relatively short, broad, fan-like tails which enable them to circle, seemingly endlessly, in the sky, rising and falling with air currents as do buzzards. When they perch they usually select a dead tree overlooking a field in which they find mice and insects so conspicuous in their diets.

When you examine the body outlines of the Falcons—peregrine (duck), pigeon and sparrow hawks, you will understand why these three birds are referred to as our "noble" hawks. Their long, pointed wings and relatively short tails equip these falcons with the speed necessary to overtake their prey in sustained flight. When seen perching, their long wings folded, they have a high "shouldered" appearance. Their rapid rate of wing beat differentiates them from other hawks. If we follow our airplane simile, truly these are the "jet-propelled" birds of prey.

The fourth group is the Harriers of which the Marsh Hawk is the only member. Its slow almost nonchalant flight, during which its white rump patch is conspicuous, mark this patroller of fields and meadows.

The accompanying illustrations and key will prove very helpful in identifying the several species in the air.

Although nearly all the hawks and owls are protected they are still a subject of controversy and for that reason the understanding of the food habits based on examinations of large nests at all seasons during the last fifty years is desirable.

Golden Eagle
(protected)

Bald Eagle
(protected)

Marsh Hawk (protected)	Mice and rats 87%; birds 12.75%; other mammals 2.45%; poultry .25%; fish, insects, etc., 50%; game 5%
Sharp-shinned Hawk (part time protection)	Songbirds 96.50%; unidentified mammals 1%; game 1.50%; poultry .50%
Cooper's Hawk (part time protection)	Songbirds 47.25%; game 24%; poultry 15.25%; mice and rats 8.25%
Goshawk (part time protection)	Game 67%; poultry 11.25%; songbirds 13.25%; mammals 4.25%; mice and rats 2.50%; reptiles, amphibians, fish, insects, etc., .25%
Red-tailed Hawk (protected)	Mice and rats 38.75%; reptiles, amphibians, fish, insects, etc., 27.50%; game 15.25%; poultry 6%; birds 7.75%; poultry 2.50%
Red-shouldered Hawk (protected)	Reptiles, amphibians, fish, insects, etc., 60.75%; mice and rats 22.50%; birds 5%; game 3.75%; mammals 3.75%; poultry 2.50%
Broad-winged Hawk (protected)	Reptiles, amphibians, fish, insects, etc., 67%; mice and rats 15.50%; mammals 12.25%; game 3.50%; bird 1.75%
Rough-legged Hawk (protected)	Mice and rats 51.75%; reptiles, amphibians, fish, insects, etc., 44.75%; poultry 3.50%
Duck Hawk (protected)	Birds 85.75%; game 14.25%
Pigeon Hawk (protected)	Birds .50%; insects .40%; small mammals 10%
Sparrow Hawk (protected)	Insects 77.50%; birds 11.25%; mice and rats 11.25%
The Osprey (protected)	Fish 100%

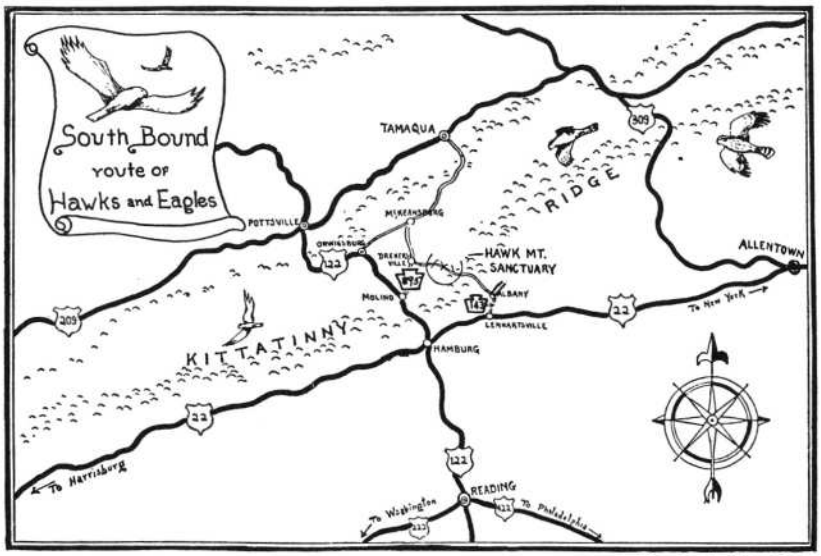
The Golden Eagle—Is a rare winter visitant most often observed in the mountainous areas. It is very large, measuring about three feet and having a wingspread of more than 6 feet. The plumage is a rich deep brown except on the head which is more golden in hue. Like the rough-legged hawk, the whole foot down to the toes is heavily feathered. Occasionally one of the magnificent creatures is caught in a steel trap set for foxes or other fur-bearers. In the field it is extremely difficult to distinguish from an immature bald eagle which lacks the pure white head and tail of the adult.

The Bald Eagle, or American Eagle—Symbol of American Liberty and Independence, this handsome, defiant creature is worthy of the honor bestowed upon it. It is a rare and irregular migrant and summer resident except at Erie and Pymatuning where it is fairly common. It is sometimes noted along the Susquehanna and Delaware Rivers where it occasionally nests. For those interested in observing the emblem of the country there is a sanctuary on Mt. Johnson Island in the Susquehanna River near Drumore south of Lancaster. It is the only eagle sanctuary in the U. S. and is administered by the National Audubon Society.

Golden and bald eagles are protected by both State and Federal laws.

One way to protect the birds of prey is to learn how to identify them well enough so that we will not shoot good hawks or owls in mistake for bad ones. There is absolutely no excuse for shooting a magnificent bald eagle in mistake for a goshawk, yet this was only one of such ignorant violations of which the Commission has record. Compare the two illustrations in this bulletin and you will see the difference.

For those who are interested in learning more about the birds of prey, there is no better outdoor laboratory than Hawk Mountain Sanctuary near Drehersville, Schuylkill County, established in 1934, which was incorporated under its own association in Pennsylvania in 1938. It has long been an excellent observation point from which to see the migrating hawks and eagles that sail southward in the autumn on the upper currents of warmer air that rise along the slopes of the Kittatinny Mountains in eastern Pennsylvania. Beginning in September or earlier, and throughout November, thousands of bird watchers visit Hawk Mountain and, if they are lucky in choosing the right day, they may see five hundred, perhaps a far greater number, of hawks and eagles and other birds in migration.



Drawing by Irma Broun

Some Thumbnail Sketches of Pennsylvania Hawks

Marsh Hawk—The marsh hawk, so called because of its preference for low, swampy areas, is our only ground-nesting hawk. It is by far the most easily recognized of the birds of prey because it is the only hawk that has a conspicuous white spot on its rump above the tail. It has long pointed wings and a long tail. Despite its large wingspread of 40 to 58 inches, its weak legs and talons compel it to exist mainly upon mice, frogs, snakes, fledglings of ground-nesting birds and other easily obtained prey. It is a common though somewhat local migrant and summer resident in Pennsylvania from March 15 through November 1. It lays 4 to 7 eggs, pale blue or chalky white, occasionally spotted with brown. Marsh hawks are protected.

Sharp-shinned Hawk—This hawk is a small replica of the Cooper's hawk, hunting through heavily wooded hemlock, beech, and birch forested areas. The difference in the wingspread of the two species is not enough to aid in distinguishing one from the other, even though both hawks may be in view at the same time.

Varying from twenty to twenty-seven inches, the wingspread of a large female sharp-shinned may match that of a small male Cooper's. Fortunately there is one characteristic which even at long distances serves as a mark of distinction between the two. Whereas the tail of the Cooper's hawk is *rounded* the tip of the sharp-shinned's is *square*.

The sharp-shinned hawk is a migrant and summer resident from March 1 through November, although it is occasionally seen in winter. The adults are blue-gray above and white, heavily barred with reddish brown beneath, except on the middle of the belly and under tail coverts. Immature birds are brown above and streaked with darker brown below. Males average 12 inches in length; females 13½ inches. The birds build a large, flat platform nest from 30 to 40 feet from the ground in which 4 to 6 pale greenish white eggs, irregularly mottled with brown, are laid. The sharp-shinned is the nemesis of all small birds and its swift flight makes it an enemy of devastating proportions. It is protected in eastern Pennsylvania during the fall migration period.

Cooper's Hawk—The Cooper's Hawk, larger cousin of the sharp-shinned, has precisely the same colaration—blue gray above and white, heavily barred with reddish brown beneath. Males average about 15½ inches; females 19 inches. A small male Cooper's Hawk is usually only a few ounces heavier than the largest female sharp-shinned.

The Cooper's Hawk resembles the goshawk in flight, and like its larger relative, *the tip of its long tail is rounded*. Its wingspread may vary from twenty-seven to thirty-six inches. There is a difference of about three inches in wingspread between a large female Cooper's Hawk and a small male goshawk. The goshawk is larger than a crow; the Cooper's is smaller than a crow.

This hawk is one of our regular residents, nesting universally throughout Pennsylvania. When seeking food it usually prefers to hunt the open hardwood areas. In fierceness and boldness it matches the goshawk, only its smaller size limiting the size of its prey.

Marsh Hawk
(protected)

Sharp-shinned Hawk
(not protected)

Cooper's Hawk
(not protected)

Goshawk
(not protected)

The nest, a bushy mass of twigs lined with bark, is from 40 to 60 feet from the ground, often in a beech tree. The eggs, 3 to 6, are chalky blue-white. Cooper's Hawks are not protected except for two months in eastern Pennsylvania during the fall migration period.

Goshawk—The goshawk, the rarest and largest of the Accipiters, is a savage destroyer of small game, being fast of wing and furious in attack. Goshawks are found mostly in the northern counties of Pennsylvania. It usually nests in a beech or hemlock tree about 40 to 60 feet from the ground and the nest is a large mass of sticks with a shallow cup lined with bark and sprigs of green hemlock. There are 3 to 5 bluish white eggs. Most of the diet of the goshawk is comprised of small game and poultry. This hawk is not protected except for a two month period in eastern Pennsylvania during the fall migration.

Red-tailed Hawk—The red-tailed hawk is a fairly common permanent resident of Pennsylvania except in the higher altitudes where it is observed only irregularly in wintertime. It is the second largest of the Buteos,

having a wingspread of from 46 to 56 inches. The sexes are colored alike, being dark brown above and whitish, barred and streaked with blackish beneath. Tails of adults are orange red above, narrowly tipped with white, with a thin black band near the tip. Its nest is a bulky affair of twigs and branches usually 50 to 80 feet up in a large, high deciduous tree. The eggs, from 2 to 3, are irregularly spotted and blotched with reddish brown. The bulk of its diet consists of mice, rats, reptiles, amphibians, fish and insects. It is protected in Pennsylvania.

Red-shouldered Hawk—The red-shouldered hawk is almost as large as its red-tailed cousin, having a wingspread of from 33 to 50 inches. It has also inherited the erroneous name chicken hawk, not because it dotes on barnyard fowl, but because it is observed more often throughout the farm and wooded areas. It is more likely to prefer *swampy areas* for hunting grounds and *utter its often repeated harsh "kee-yoo" scream more often as it flies.* When soaring, its most easily identified feature is *the translucent spot on its wing near the tip, formed by the short black and white markings.* Quite often this hawk, like the Accipiters, will decoy to a crow-calling shooter.

The birds are dark brown above with bright rufous shoulders; bright reddish brown beneath, barred on the belly, sides and flanks with white. Tails of adults are strikingly barred with black and white. Immature birds are generally much duller in color, but show the reddish shoulder patches. The average male is 18½ inches in length; the female 21 inches. The bird is a summer resident from March 1 through December 1, sometimes wintering in the southern part of the state. The nest is of twigs lined with leaves and other fine materials, including a fine sprig or two of fresh hemlock. It is built usually in a beech or hemlock about 30 to 60 feet from the ground. The eggs, 3 to 6, are pale greenish white, irregularly blotched with dark reddish brown. This hawk is protected.

Broad-winged Hawk—The broad-winged resembles the large red-tailed hawk in general appearance. The smallest of the Buteos, about the size of a crow, its wingspread varies from 32 to 39 inches. Unlike its larger relatives, it prefers the forested areas to the open fields or swamps. Usually the bird will perch in a low branch of a tree while waiting to seize its prey, of which insects, small snakes and amphibians comprise quite a large percentage. A distinguishing feature is its gregarious habit when migrating southward. Large groups may be seen during the early fall months as they fly, sometimes at great heights, to their southern range. They are usually the first of our native hawks to begin this southern movement. The tamest of the hawks, the broad-winged can be fairly easily approached by the observer on foot.

Broad-wings are gray brown above, warm brown beneath, the belly and sides being heavily barred with white. The males average 16 inches; the females 17 inches. It is a common and local summer resident from mid-April through September. It never occurs in winter as it migrates to Central America during the cold months. The nest is a platform of sticks usually placed in a large crotch of a deciduous tree about 80 to 90 feet from the ground. Sometimes an old crow's nest is used. The 2 to 4 eggs are whitish, spotted and blotched with rich brown. Broad-wings are protected.

Rough-legged Hawk—The rough-legged hawk, largest of the Buteos, is a heavy bodied hawk boasting two color phases—one brown with whitish streaked throat, breast and feathered thighs; the other blackish. Both are spotted irregularly with white on the belly.

When viewed from below or when seen perching, the rough-legged, in either its black or dark brown color phase, has *dark underparts* which serve to identify it. Furthermore, when hunting its food, this hawk flaps slowly over the tops of weed and brush fields, from which it drives the mice which comprise the bulk of its diet. Distinguishing it among the remaining three members of the Buteo family is somewhat difficult. Differences in wingspread and body length aid the observer, but these are relative factors and are only of true value when two or all three of the remaining members of the genera may be observed simultaneously.

The rough-legged is a rare and irregular winter visitor from the far north, occurring chiefly in the northern counties in fairly open territory, where it will perch on a hay-stack, on a low stump, or in an open field in preference to a high stub. Its method of seeking prey is akin to that of the marsh hawk, beating over potential hunting territory close to the ground. One of the positive means of identification is the *feathered legs*. This characteristic is also true of the golden eagle. Another excellent field mark is its habit of hovering with beating wings, like a sparrow hawk. Length about 22 inches. Rough-legs are protected.

Red-tailed Hawk
(protected)

Red-shouldered Hawk
(protected)

Broad-winged Hawk
(protected)

Rough-legged Hawk
(protected)

Duck Hawk
(protected)

Pigeon Hawk
(protected)

Sparrow Hawk
(protected)

Osprey
(protected)

Peregrine or Duck Hawk—This, the largest and rarest of our falcons, has a wingspread ranging from thirty-eight to forty-six inches. It is famous for its speed and daring, and pursues and captures the fastest flying ducks, even teal. It is a rare summer resident from March to November along cliff lined rivers, lakes or streams, where it usually nests. It also nests occasionally in large cities, one pair having taken up its abode in the spire of a church in Harrisburg for several successive years. A pair has frequently been observed stooping at pigeons around Capitol Park. There are also records of migrating duck hawks taking up winter residence in our larger cities. There, the tall skyscrapers provide the heights from which they may dive upon the flocks of pigeons or starlings found in urban areas.

Pigeons who knew peregrines (duck hawks) were nesting on a cliff near Dauphin, Pennsylvania, would always fly beneath the telephone wires when passing that area to keep from being struck.

Male peregrines (duck hawks) average 16 inches in length; female 19 inches. Adults are bluish slate, heavily barred with darker gray above; the tail is tipped with white, and the underparts are buffy, barred and spotted with black, chiefly on the sides and flanks. The "mustaches" visible on perching birds are diagnostic. Immature birds are dark brown above and below, nearly all the feathers widely margined with buff. The eggs, 3 to 6, are whitish, heavily spotted with rusty or chocolate brown, or solid brown. They are laid either on the bare rock in a sheltered niche on a high cliff, or in a slight depression in the earth on such a ledge if there is any soil. The birds are protected.

Pigeon Hawk—This falcon is very rare and the observer is not likely to see it unless he is in a position to watch the annual migration of hawks from some vantage point in Pennsylvania. It is approximately the same size as the sharp-shinned hawk. However, its long, pointed wings and relatively short tail present exactly the opposite combination to the short, rounded wings, and relatively long tail of the Accipiter. In its rapid, graceful flight it somewhat resembles an oversized swallow. Like the sharp-shinned, the food of the pigeon hawk is composed mainly of small birds. It captures its prey, however, in open flight rather than by darting upon it.

It occurs usually in late April and early May and in late September and early October. Adults are blue gray narrowly streaked with black above, and buff streaked with black beneath, except on the throat. Immatures are dark brown above, buff beneath. Length about 10 inches. Dr. George M. Sutton in his "Introduction to the Birds of Pennsylvania, 1929" says "so many hawks are called pigeon hawk that it is difficult to make Pennsylvania farmers and gunners realize this little hawk is a comparatively rare bird. I have noted them in Pennsylvania only a few times. Each time the hawk was surrounded and besieged by a flock of swallows, one of which it may be been holding in its talons." The birds are protected.

Sparrow Hawk—The sparrow hawk is a common and widely distributed summer resident from March 10 to November 15; it is also a fairly common winter resident. It is the smallest of all Pennsylvania hawks, being not much bigger than a robin. It is commonly seen perching on telephone wires or suspended in the air on rapidly beating wings. It nests in tree cavities and lays 3 to 7 buff to brownish eggs heavily spotted with reddish brown. It eats principally insects and mice and is protected in Pennsylvania.

Osprey—Imagine you are fishing on a pond or lake, lazily drifting in a boat, hoping that a perch, bullhead, or bluegill will show some interest in the worm with which you have baited your hook. As you glance skyward you notice a large bird, appearing mainly white or light gray on the belly and breast. There is an odd inverted, broad "V" set to its long and narrow 5 foot wings. A head-on view of the bird resembles nothing so much as the famous Stuka dive-bomber used early in World War II by the German Luftwaffe. It may or may not call; if so, its vocal efforts sound somewhat like those of a small, insistent chicken. Suddenly the bird hovers for an instant and then, folding its wings, drops into the water with quite a splash, sometimes completely submerging before rising with a fish held in its powerful talons. In summary, its gull-like flight, its preference for open water, its large body with its long, narrow, peculiarly shaped wings, its color pattern, its call, together with its action of diving for a fish, all serve to identify this bird as the osprey, or fish hawk.

The osprey is common and regular as a migrant principally along the waterways, and occurs in April and May and in September and October, but is rare and local as a summer resident. It is blackish brown above, the feathers margined with brown; shining white beneath, with brown spot on the breast, particularly in the female. Length about 23 inches. The nest is a bulky mass of sticks and debris sometimes placed at the very top of a dead tree. The eggs, 2 to 4, vary much in their coloration. They are whitish, spotted with reddish brown or a solid rich brown. They are protected.

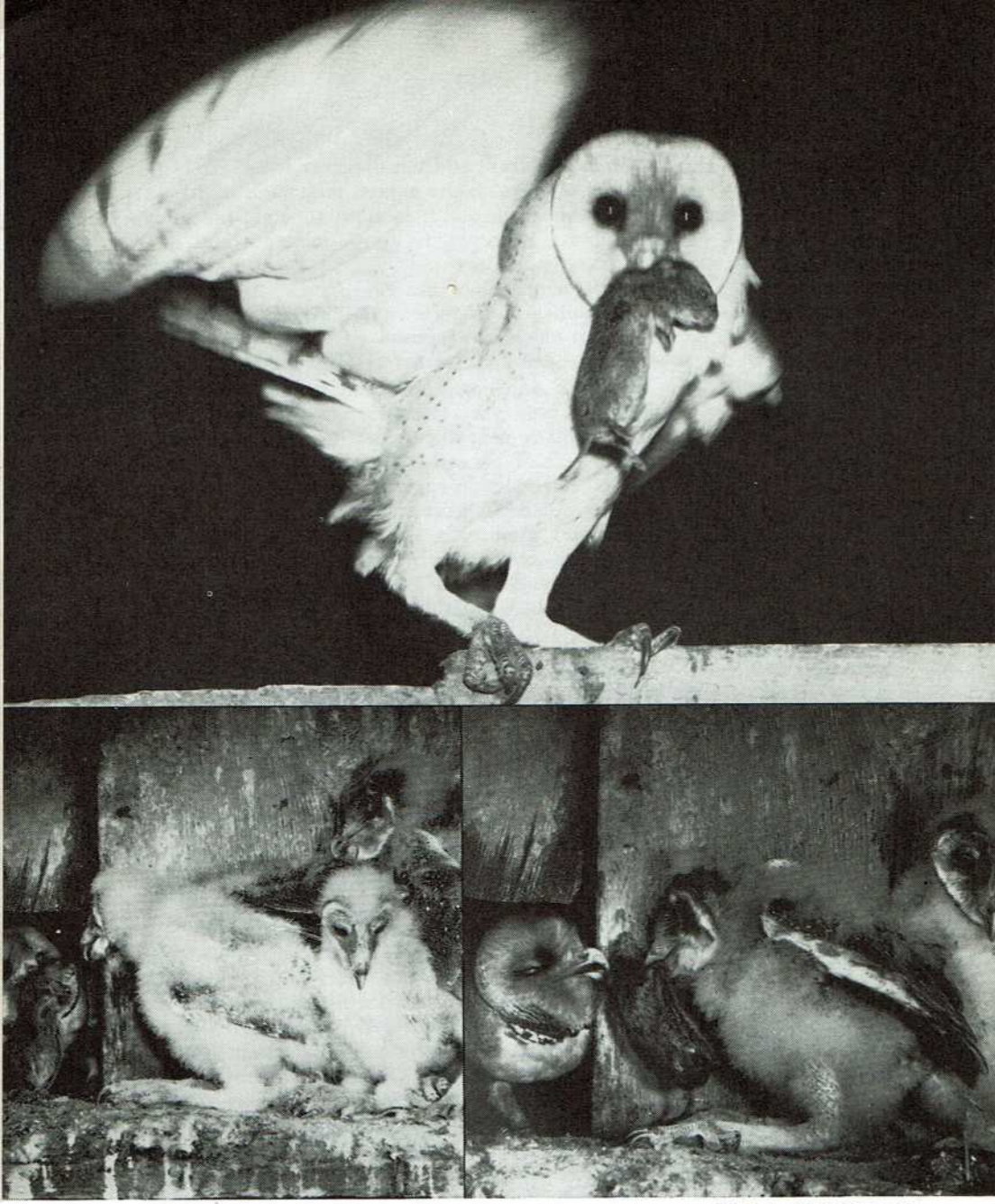


Photo by Karl Maslowski.

Barn owl coming to nest in pigeon loft with meadow mouse and voracious youngster greedily snatching it.

Owls

We have eight different kinds of owls in Pennsylvania. Four of these —the screech owl, the great horned owl, the barred owl and the long-eared owl are permanent and fairly common residents throughout the Keystone State. The barn owl and the short-eared owl are summer residents from March to November. The snowy owl is a rare and irregular visitor, invading Pennsylvania only when food is scarce in its Northland home. The saw-whet owl, a tiny owl smaller than the screech owl, is an irregular winter visitor throughout central and northern Pennsylvania. This little owl is the most beneficial of all birds of prey. He has no bad habits. His diet consists of 50% mice and 50% insects.

Like the hawks, most owls have been accused of killing small game, poultry and insectiverous songbirds. Although all but two (the great horned and the snowy owls) of the owls are protected in Pennsylvania because their good habits have proved to be more beneficial than harmful, they all are sometimes condemned. It is desirable to understand their food habits and recognize the benefits of these birds. Conservation scientists have learned the food habits of the different owls from many examinations of many nests at all seasons during the last fifty years, so the following conclusions are fairly accurate and speak for themselves.

Barn Owl (protected)	Mice 75%; other mammals 25%
Screech Owl (protected)	Reptiles, amphibians, fish, insects, etc., 41.25%; mice 22.75%; other mammals 18%; songbirds 18%
Great-horned Owl (not protected)	Game 49.50%; mice and rats 22.75%; unidentified birds 9.25%; other mammals 6.25%; poultry 5.75%; reptiles, amphibians, fish, insects, etc., 5.50%; unidentified mammals 1%
Snowy Owl (not protected)	Game mammals and birds .75%; mice .25%
Barred Owl (protected)	Mice and rats 44.25%; other mammals 39.50% game 7.50%
Long-eared Owl (protected)	Mice and rats 93.25%; other mammals 4%; songbirds 2.75%
Short-eared Owl (protected)	Mice 85%; songbirds 10%; unidentified mammals 5%
Saw-whet Owl (protected)	Mice 50%; insects 50%

Owls are nocturnal birds. They do their hunting at night and sleep during the day. Like the hawks, their claws are talons for seizing their prey. Their beaks are short and hooked.

Some Thumbnail Sketches of Pennsylvania Owls

Barn Owl—One of the most beneficial birds of prey in the Commonwealth. It is a fairly common though somewhat local resident in summer, chiefly in the southern and southeastern counties, from late March to November, but rarely present in the northern and mountainous counties. It occasionally winters here. It has a face like a monkey and silk-like plumage. It is golden brown above, much variegated with fine gray barring and black and white speckling. Beneath it is white or buffy, finely spotted with black. It is a cavity nester but sometimes chooses a barn loft or silo where it lays from 5 to 9 white eggs. Though chiefly nocturnal, it can see perfectly by day. It is protected.

Photo by Karl Maslowski.

Screech owl with choice tidbit, probably a June bug, for its expectant young.

Screech Owl—A common permanent resident throughout the Commonwealth. A sociable little fellow, the screech owl lives in towns and cities as well as in woodlands. It is about 9½ inches long and is our only small owl with horns or ear tufts. It occurs in two color phases—red and gray and is conspicuous by its long ear tufts or horns. In the red phase the upperparts are bright reddish brown finely streaked with black and barred with reddish brown chiefly on the sides. The underparts are white. In the gray phase the upperparts are gray mixed with brownish and streaked with blackish and mottled with white and buff, and the underparts are white, streaked and barred with black, grayish and white. Screech owls are cavity nesters and lay 4 to 6 white eggs. The screech owl is protected.

Great-horned Owl—A fairly common permanent resident throughout the Commonwealth. Identifying marks include the prominent tufts or horns, feet fully feathered down to the claws. Above it is mottled and speckled with gray, black, white and buffy; throat pure white; beneath it is buffy and white, finely and thickly barred with black. It usually begins nesting in mid-February in a large cavity or old crow's nest and lays 2 to 3 white, nearly round eggs. This bird is not protected.

Snowy Owl—The snowy owl is a rare and irregular visitor though it sometimes invades Pennsylvania in large numbers when food is scarce in its Northland home. It is a bird of the open fields, not of the woodlands, and may be seen perched on a fencepost, haystack or on the ground, rather than in a tree. It is as large as the great horned owl and its feet are so heavily feathered that the claws are sometimes hidden. True to its name, the bird is white, usually barred with dark grayish brown, particularly on the back, wings and sides of the breast. Some individuals are pure white with no barring. It is not protected.

Barred Owl—This owl is a fairly common local permanent resident, found mostly in the deep woods usually along streams or in the lowlands. The barred owl is the real hooter of the family, hence the nickname hoot owl. It is about 20 inches long, round headed, dull chocolate brown above and whitish or grayish underneath. The breast is distinctly *barred*, whereas the belly and sides are *streaked* with dark brown. The eyes are very large, dark brown with blue black pupils. Barred owls nest in tree cavities and in the open, and lay 3 to 4 round white eggs. They are protected.

Long-eared Owl—The long-eared owl is a fairly common though somewhat local resident which may migrate to an extent when food is scarce during winter. They are retiring creatures and unless the bird student searches for them assiduously he may never find them, for they are neither noisy nor bold. Look for them in dense hemlock clumps, in cedars, or thick grapevine tangles where, if you are observant, you may come upon their pellets which are usually cast up during the daytime at favorite nesting places.

Long-eared owls are highly beneficial, living almost altogether on mice which they catch along the edges of fields or in the woodlands. This owl, about the size of a crow, is much smaller than a great-horned owl. Beneath, it is streaked lengthwise, not barred crosswise. The birds are

gray above, mottled with buffy brown and speckled with black and white. Beneath they are whitish, washed irregularly with buff. Length about 15 inches. The two long ear-tufts are set much closer together on the head than the widely separated tufts of the great-horned owl. The feet are fully feathered.

The call-note of this owl, which is not frequently heard, somewhat resembles the quavering whistle of a screech owl, but is shorter, more whining and less musical, being varied with angry, coughing sounds.

The nest is a flat platform of twigs, sometimes built upon the old nest of a squirrel or crow. It is lined with finer materials and a few breast feathers from the birds. The eggs, 4 to 6, are white. This owl is protected by law.

Short-eared Owl—Any medium-sized owl which flies up from the ground in the open is almost certain to be a short-eared. It hunts usually at dusk, wending its silent way over the meadows and marshes only a few feet from the ground, where it nearly always perches. A good field mark, noticeable as the bird flies away, is the light spots on the upper surfaces of the wing and the dark spots at the bend of the wing on the under surface.

The bird is dark brown above, the feathers margined with buffy brown, the wings spotted and barred with buffy, and the tail marked with rich buffy brown bands of about equal width. Underneath it is buffy or whitish, streaked broadly on the breast and narrowly on the belly with dark brown.

The short-eared is a great mouser, capturing its prey almost always in the open. Flocks during migration sometimes number a hundred or more. When these owls visit a farm in such numbers for a week or two they may effectively destroy the mice and other destructive small mammals. The birds are with us from March 1 to April 15 and from October 1 to mid-November. Sometimes it is found in winter in the lowlands of the less mountainous parts of the Commonwealth. They are curious and can be encouraged to approach quite closely if you "squeek them up" by kissing the back of your hand in imitation of mouse or young bird.

Short-eared owls are about 15 inches long. They are protected.

Saw-whet Owl—The saw-whet, smallest of our owls, is an irregular visitor in winter throughout central and nothern Pennsylvania, though it nests rarely in the northern mountainous counties. Its home is a cavity, frequently a deserted woodpecker's nest, where it lays 3 to 5 white eggs. It is seldom seen and sleeps so soundly by day that it may be easily captured in the hand. Above it is dull chocolate brown, finely streaked on the head, and spotted on the back and wings with white; the underparts are white broadly streaked with dark reddish brown. Search for him in the dense alder and hemlock growths, or in vines. The saw-whet is protected and records of him are very desirable. It is extremely beneficial.

If you ever come across one of these little owls, either alive or, for example, freshly killed by flying into the windshield of your automobile, by all means notify the Game Commission at Harrisburg immediately. The Commission is very anxious to obtain a live bird to exhibit and photograph and a dead bird for mounting. This tiny owl is smaller than the screech owl and may be distinguished from that species by its lack of eartufts.

Screech Owl
(protected)

Great-horned Owl
(not protected)

Snowy Owl
(not protected)

Barred Owl
(protected)

Long-eared Owl
(protected)

Short-eared Owl
(protected)

Saw-whet Owl
(protected)

KEY FOR IDENTIFICATION OF HAWKS AND EAGLES

1 Bird with legs completely feathered. (Refer to 2.)

1 (a) Bird not having legs completely feathered. (Refer to 3.)

2 Bird with wingspread less than 60 inches and body length less than 27 inches. *ROUGH-LEGGED HAWK.*

2 (a) Bird with wingspread more than 60 inches and body length more than 27 inches. *GOLDEN EAGLE.*

3 Bird with body length greater than 28 inches. *BALD EAGLE.*

3 (a) Bird with body length less than 28 inches. (Refer to 4.)

4 Bird with conspicuous white spot above the tail. *MARSH HAWK.*

4 (a) Bird not having conspicuous white spot above the tail. (Refer to 5.)

5 Bird with "toothed" upper beak and notched lower beak. (Refer to 6.)

5 (a) Bird without "toothed" upper beak and without notched lower beak. Refer to 8.)

6 Bird with wingspread greater than 33 inches. *DUCK HAWK.*

6 (a) Bird with wingspread less than 33 inches. (Refer to 7.)

7 Bird with broad black band extending downward from the eye, and with middle toe only normally larger than other toes. *SPARROW HAWK.*

7 (a) Bird without such eye marking, and with middle toe very much larger than other toes. *PIGEON HAWK.*

8 Bird with folded wing extending beyond the tail. *OSPREY.*

8 (a) Bird with folded wing not extending beyond the tail. (Refer to 9.)

9 Bird with relatively short, broad wings and relatively long, narrow tail. One wing length usually less than half again the length of tail. (Refer to 10.)

9 (a) Bird with relatively long, broad wings, and relatively short, broad tail. One wing length usually half again the length of tail. (Refer to 12.)

10 Bird with square tip of tail. *SHARP-SHINNED HAWK.*

10 (a) Bird with rounded tip of tail. (Refer to 11.)

11 Bird with wingspread greater than 38 inches. *GOSHAWK.*

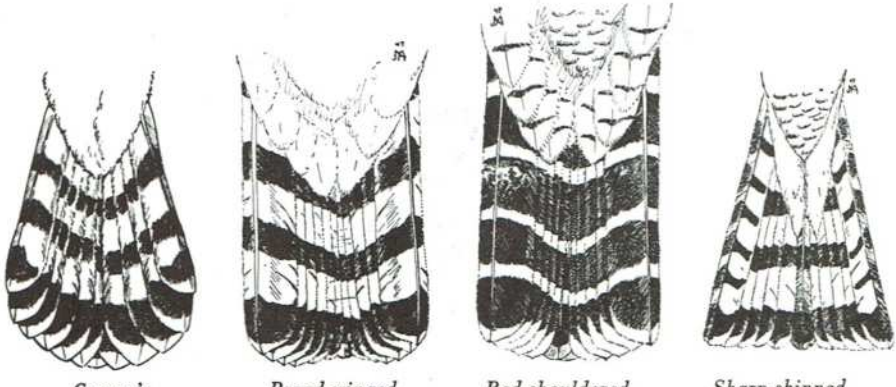
11 (a) Bird with wingspread less than 38 inches. *COOPER'S HAWK.*

12 Bird with central area of breast in which feathers are unmarked by bars or spots. *RED-TAILED HAWK.*

12 (a) Bird with feathers in central area of breast bearing bars or spots. (Refer to 13.)

13 Bird with body length greater than 18 inches, and with tail usually having more than 3 narrow black bands. *RED-SHOULDERED HAWK.*

13 (a) Bird with body length less than 18 inches, and with tail usually having 2 or 3 broad black bands alternated with white. *BROAD-WINGED HAWK.*

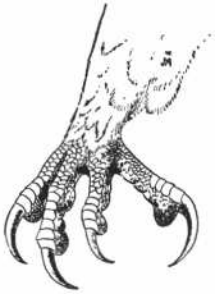


Cooper's *Broad-winged* *Red-shouldered* *Sharp-shinned*

Bill of Goshawk (non-toothed)

Bill of Duck Hawk (toothed)

Goshawk (Tarsus partially feathered)



Rough-legged Hawk (Tarsus fully feathered)

KEY FOR IDENTIFICATION OF OWLS

1 Bird with ear tufts. (Refer to 2.)

1 (a) Bird without ear tufts. (Refer to 5.)

2 Bird with normal weight over 2 lbs. and body length over 18 inches. *GREAT HORNED OWL.*

2 (a) Bird with weight under 2 lbs. and body length less than 18 inches. (Refer to 3.)

3 Bird with body length less than 12 inches. *SCREECH OWL.*

3 (a) Bird with body length greater than 12 inches. (Refer to 4.)

4 Ear tufts long and conspicuous. *LONG-EARED OWL.*

4 (a) Ear tufts small and very short. *SHORT-EARED OWL.*

5 Bird generally pale or white in color. (Refer to 6.)

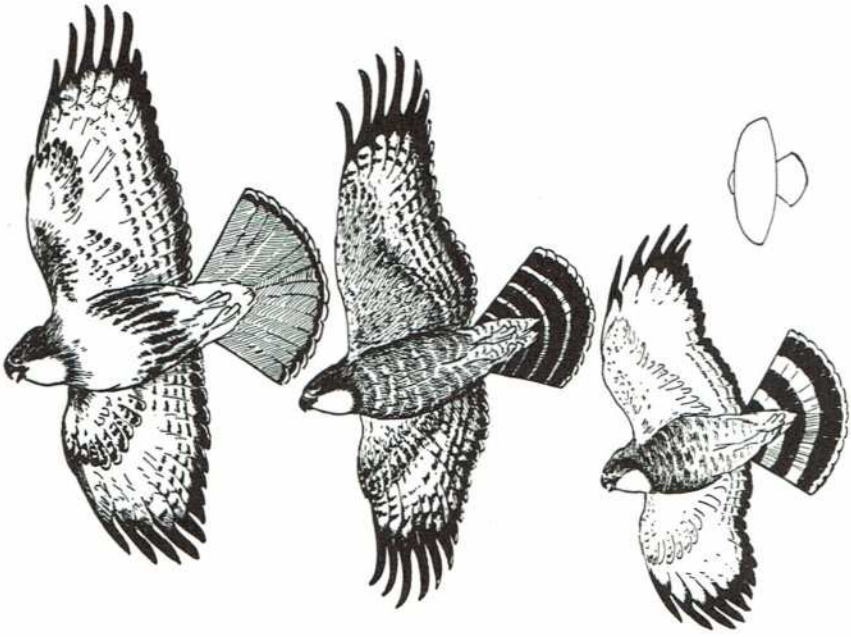
5 (a) Bird generally dark in color. (Refer to 7.)

6 Bird with normal weight over 2½ lbs. and wingspread greater than 50 inches. *SNOWY OWL.*

6 (a) Bird with body weight under 2½ lbs. and wingspread less than 50 inches. *BARN OWL.*

7 Bird with body length less than 12 inches and with wingspread less than 30 inches. *SAW-WHET OWL.*

7 (a) Bird with body length greater than 12 inches and with wingspread greater than 30 inches. *BARRED OWL.*



Red-tailed Hawk *Red-shouldered Hawk* *Broad-winged Hawk*

CLASSIFICATION OF PENNSYLVANIA HAWKS

(Identification in the field)

IF THE reader will look on the opposite page he will see hawks illustrated as they would appear to him in the field through binoculars or a telescope. They are certain characteristics of flight, body lines, sounds, and actions which will help identify them from a distance. Many of these field identification marks are given *in italics* in the text concerning each species.

ACCIPITERS

With their characteristic short, rounded wings and relatively long tails, the Goshawk, Cooper's and Sharp-shinned Hawks might be classed as the "pursuit ships" among the winged predators, as contrasted to the slow moving Buteo "bombers." In addition to speed, their wing and tail combination affords them the maximum in maneuverability, as anyone who has seen them pursue their prey through forested coverts may well recall. Normally these birds employ the same type of flight, which has created for them the common name "darters." Swinging in wide circles through their favorite haunts, the forests, they suddenly break into an extended period of wing flapping. A hawk observed sailing, then flapping, sailing, etc., in cross country flight will undoubtedly prove to be one of these three species.

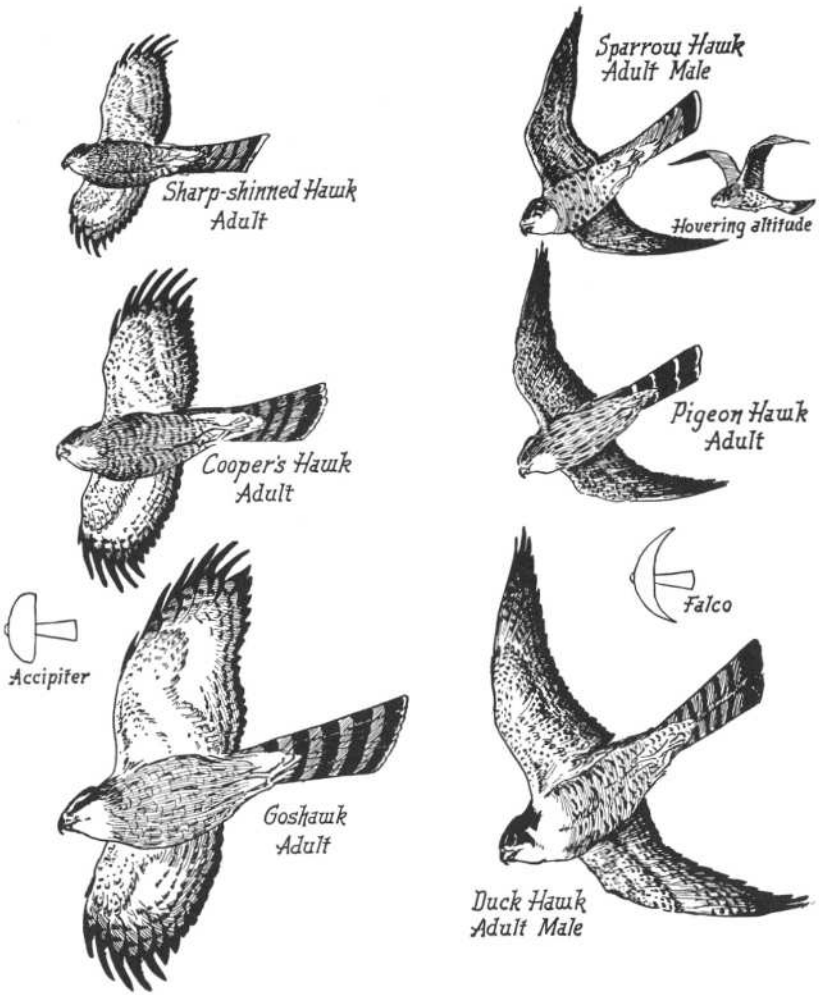
BUTEOS

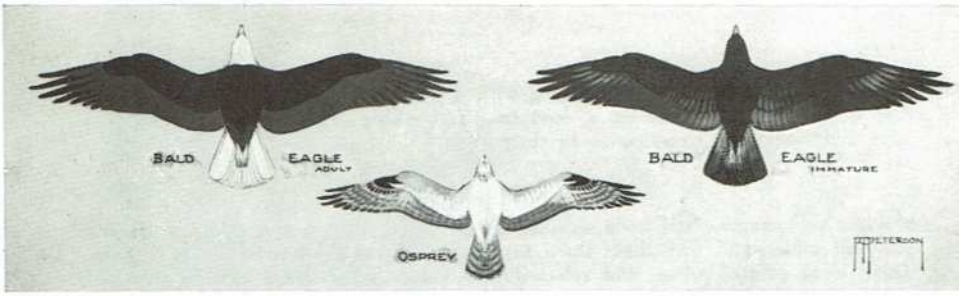
The Buteos, or soaring hawks, including the Red-tailed, Red-shouldered, Broad-winged and Rough-legged comprise another group which fly in the same manner, have similar body lines, and eat similar foods. These hawks have long, broad wings and relatively short, broad, fan-like tails which enable them to circle, seemingly

endlessly, in the sky, rising and falling with the air currents as do buzzards. When they perch they usually select a dead tree overlooking a field in which they find mice and insects so conspicuous in their diets.

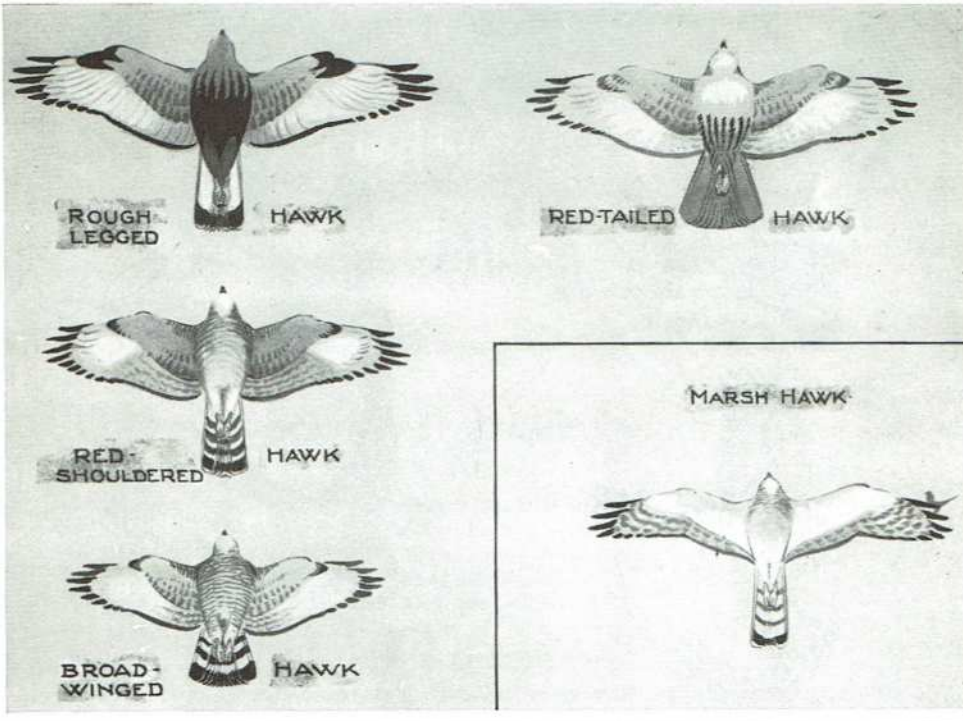
FALCONS

When you examine the body outlines of the Duck, Pigeon and Sparrow Hawks, you will understand why these three birds are referred to as our "noble" hawks. Their long, pointed wings and relatively short tails equip these falcons with the speed necessary to overtake their prey in sustained flight. When seen perching, their long wings folded, they have a high "shouldered" appearance. Their rapid rate of wing beat differentiates them from other hawks. If we follow our airplane simile, truly these are the "jet-propelled" birds of prey.





How the birds of prey look from below. Drawings courtesy Roger Tory Peterson and the National Audubon Society.



Courtesy National Audubon Society.

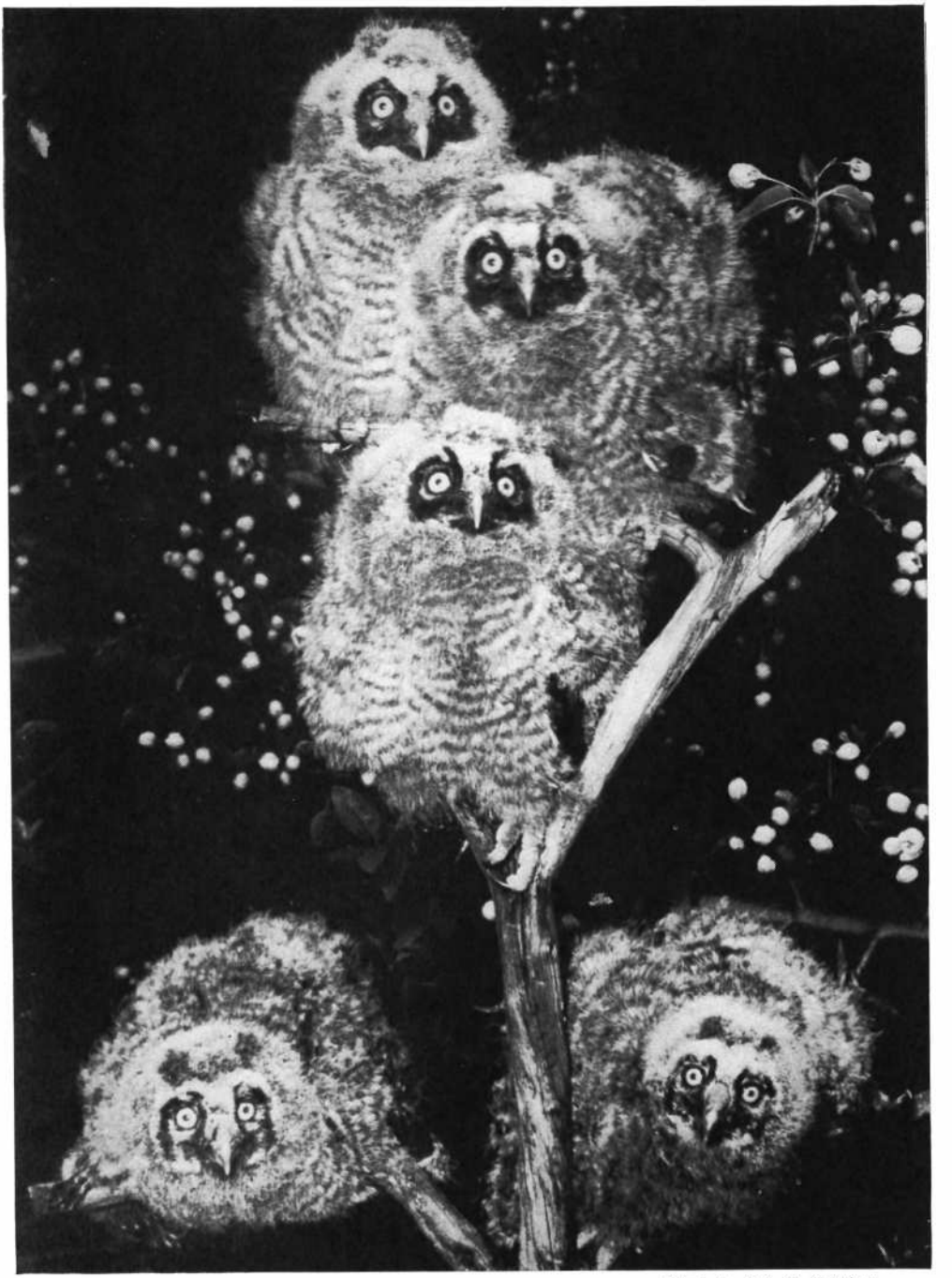


Photo by Hal H. Harrison.

Young nesting long-eared owls.

Song and Insectivorous Birds

More space in the bulletin will be devoted to the songbirds than any other kinds of birds for two reasons. They are more numerous and more people are taking an interest in them. Those which occur in Pennsylvania either as permanent residents, winter or summer visitants or as migrants are listed in the appendix for the readers convenience. Many are illustrated in color elsewhere throughout the booklet. For this reason particularly, physical descriptions of them will be omitted.

Let us begin our study of this group by classifying them according to the role they play in our economy. For example one group patrols the air in search of food, taking hundreds of insects on the wing. They include the swifts, swallows, martins, nighthawks and the whippoorwills.

Another group looks after our foliage. Among these are the warblers and vireos who search under the leaves for small insects and worms. Other birds such as the robin, wren, mockingbird, catbird, brown thrasher, the thrushes, the orioles, and cuckoos eat the insects and worms which are too large for the smaller warblers and vireos to handle. The orioles and cuckoos should have honorable mention because they are among the few birds which will eat the hairy caterpillars.

The third group looks after the bark. They are so constructed that they can walk up and down the tree trunks where they pry into every nook and crevice from which they remove many insects and eggs. Some even drill into the bark to get worms and beetles. This group includes the creepers, nuthatches, some of the warblers, kinglets and the woodpeckers.

Still another group patrols the ground floor where many of our most destructive insects and beetles may be found. They are the meadowlark, blackbird, crow, robin, the sparrows, towhee, brown thrasher, ovenbird, the ground warblers, the killdeer and the flicker. The flicker is especially fond of ants and eats many of them.

The fifth group may be classified as weed destroyers because they eat millions of weed seeds thereby keeping these destructive plants in check. All the sparrows and finches are in this group as are the juncos, grosbeaks, blackbirds, meadowlarks, towhees, grackles and bobolinks.

The sixth and last group are principally rodent destroyers including the hawks and owls, which we mentioned in another chapter, and the crow. The crow is too often improperly evaluated. He destroys nests and eggs and newly planted corn, but the extent of his damage is predicated on his large numbers. If more sportsmen and others would help to thin out his ranks his good habits, and there are many, might at least equal his bad ones.

Other birds which have been outlawed because they apparently did no good are the English Sparrow and the European Starling. Now, however, more respect is shown them because they are known to be consumers of the Japanese beetles. No bird should ever be condemned until a careful study of its food habits has been made.

Many birds are colored to blend with the environment in which they live. This is necessary in order that they may successfully raise and protect their young. The woodcock blends admirably with its surroundings and it is hard to find unless you flush one off the nest. The eggs of the killdeer and the incubating mother can hardly be seen on the bare ground unless she moves off the eggs to lure you away by feigning to be crippled. The eggs of birds vary in size, color and number, from the hummingbird

Photo by Hal H. Harrison.

Baltimore oriole at nest.

Photo by Maslowski and Goodpaster.

Prothonotary warbler at nest

to the Canadian Goose or the bald eagle. As a rule the eggs laid in dark places are white. Many others are colored, some a uniform brown color, others with spots of various hues and still others having both a ground color and spots. For those who are interested in learning to know and identify the eggs in relation to their owners may we refer you to the bibliography on this subject in the appendix.

Eggs laid at a setting may vary from one to about twenty. For example the robin lays about 3 or 4, the bluejay about 4 or 5, the bobwhite quail 10 to 18, average incubation takes about 12 days except in the case of the game species and the birds of prey, most of which are from 21 to 23 days. In some cases only the female incubates, in other instances both parents incubate.

For those who are interested in learning more about birds and their names and colors and general utility we are including a topographical illustration showing the bills and the feet of the various groups. These are important instruments in feeding. For example, the woodpeckers have chisel-edged bills for chipping wood, the herons have long, sharp bills for catching fish and frogs; the ducks have wide beaks with toothed edges to dig up mud and sift out the water; the crossbills are miniature pliers which enable them to open cones to obtain the seeds; the whippoorwill has a wide mouth surrounded by stiff hairs to catch insects on the wing; the finches have short bills for seed eating; the slender bills of the woodcock

and snipe and many shorebirds enable them to probe after food in the mud; and the hummingbird has a long slender bill for drawing nectar from the flowers. Bird's feet also are given to activity and are molded by nature accordingly. The feet of the songbirds are adapted for perching; those of the woodpeckers for climbing (the tail is used as a prop); the herons for wading, the waterfowl for swimming. Perhaps the only birds which have little use for their feet are those members of the air patrols including the swifts, martins, nighthawks and the swallows.

Some Thumbnail Sketches of Song and Insectivorous Birds of Pennsylvania

Robin—Probably most popular Pennsylvania bird; found everywhere; some year round residents, others migrate March-November. Nest is a neat cup of grasses, weed stalks, string, etc., with inner lining of mud; placed in trees, under a roof. Eggs—3 to 5 blue; incubation 11 to 14 days; broods, two or three. Food is largely earthworms; also insects, fruits and berries.

Bluebird—The "harbinger of spring;" common summer residents from early March to November; casual in winter. Found chiefly in cultivated areas. Nest is of grasses, in tree cavity or birdhouse, 5 to 20 feet from the ground. Lays 4 to 6 light blue eggs; incubation for 12 days by both parents; 2 to 3 annual broods. Food is mostly insects, some weed seeds and wild fruit. Starlings drive bluebirds from nesting sites.

Red-Winged Blackbird—Common summer resident from mid-March to early November; found in marshes, low, wet meadows; around streams and lakes. Nest is neatly woven basket of dry grasses, suspended between cattail stalks a few feet above water or ground. Eggs—3 to 6, pale blue, spotted and scrawled with black; incubation 10 to 14 days; 1 to 2 annual broods. Food is largely insects and grains.

House Wren—One of the most popular Pennsylvania birds; common summer resident from mid-April to late September. Nests in man-made birdhouses but also in natural cavities. Nest is a bulky mass of twigs, lined with feathers. Lays 5 to 9 pinkish white eggs finely spotted and wreathed with reddish brown; 1 to 2 broods per year. Food is largely insects.

Meadowlark—Common summer resident from mid-March to November; some winter residents. Found in fields and meadows. Nest in open fields; nest built of grasses, usually with roof; 3 to 6 white eggs, spotted with reddish brown. Food is almost entirely insects, most of which are injurious to crops; in the fall meadowlarks eat weed seeds.

Phoebe—Common summer resident from mid-March to November. Found along borders of wooded or brushy streams, about farms, usually near stream or pond. Nest under bridge or rock ledge, under porch roof; nest made of moss, mud covered and well lined; 3 to 6 white eggs. Food is almost entirely insects. One of the most valuable birds.

Ruby-throated Hummingbird—Our smallest bird; common summer resident from May 1 to October 1. Found in open woodlands, orchards, often in urban gardens. Nest is small dainty structure made of plant-

down, lichens, and cobwebs fastened to tree branch 4 to 30 feet above ground; 2 white eggs. Food—nectar and insects. Flight speed—55 m.p.h.; wing beat 50-80 times per second.

Downy Woodpecker—Smallest true woodpecker; permanent resident; found almost anywhere trees grow. Nest is a cavity in a dead stub, usually 15-30 feet from the ground; entrance about 1½ inches; 4-6 glossy white eggs. Food is almost entirely insects; easily attracted to feeding trays, fond of suet.

Whippoorwill—Summer resident from April 20 to September 30; found only in deep woodlands. Famous for call on summer evenings. Two white eggs laid on leaves or ground. Food—entirely insects, including moths, mosquitoes, June beetles, gnats. Never flies high in sky like nighthawk.

Cardinal—Permanent resident; popular visitor to winter feeding stations. Nest is neat, thin cup of weed-stalks and grasses, lined with fine grasses or hair. Eggs—3-4, white, spotted and speckled with lilac and gray; incubation 12 days. Food—seeds, wild fruit, grains, insects.

Ruby-throated hummingbird.

Photo by Donald H. Heintzleman.

Photo by Hal H. Harrison.

Young wood pewees.

CHAPTER VII

BIRD FAMILIES

THERE is another way of studying birds which provides much information the amateur would often overlook, and that is by family classification, of which there are many.

For example the thrush family includes the bluebird, robin, woodthrush; veery and other thrushes. Then there is the wren family and those which are always mocking their neighbors such as the mockingbird, catbird and brown thrasher.

The warblers are a big family and often hard to identify but patience will prevail if you stick to it.

The swallow family includes the purple martins which many bird lovers do not realize, and the blackbird family includes the orioles, meadowlark, cowbird and bobolink which still more persons are not aware of.

Then there is the family of "carpenters in feathers" or woodpeckers, the flycatcher family of which the kingbird and wood pewee are also members, and the friendly vireos.

Some neighborly acrobats include the ruby-crowned and golden-crowned kinglets; chickadees, tufted titmice, and the nuthatches, while others are what you might term queer relations such as the whippoorwill, nighthawk, chimney swift and ruby-throated hummingbird.

Then there are two rascally relations, Mr. Crow and Mr. Bluejay, and those special individuals—mourner the dove, whistler the bobwhite and drummer the grouse. Finally there are the kingfishers and cuckoos.

CHAPTER VIII

IF YOU WANT MORE BIRDS

You Can Help Increase Game Bird Population

Winter Feeding—Our responsibility to wildlife does not end with improving habitat for it. When winter comes and much of the food and shelter is frequently covered with snow and ice, game and other wild birds must be cared for. Nearly anyone adjacent to rural areas can help to feed their feathered neighbors during these severe periods. But their efforts must be well organized. To simply carry feed into the fields and woodlands and scatter it promiscuously is wasting a lot of time, money and effort. Landowners are familiar with the places used most frequently by game birds when they are seeking refuge, and some of them provide feeding shelters wherever necessary. Very often this job becomes the responsibility of the farmer boys, who know every inch of the farm from having run trap lines over it year after year. The following illustrations show the different kinds of shelters and feeding stations which can be constructed. Odd unused corners of fields are ideal places for creating feeding shelters during winter and the interested landowners should allow them to grow up to natural cover and where necessary provide additional shelter in the form of brush piles, corn stalks leaned against fences or other spots; whole shocks of corn with at least two ends left open to permit feeding birds to escape from predators; logs piled tepee-wise or one upon the other for several feet then covered with brush.

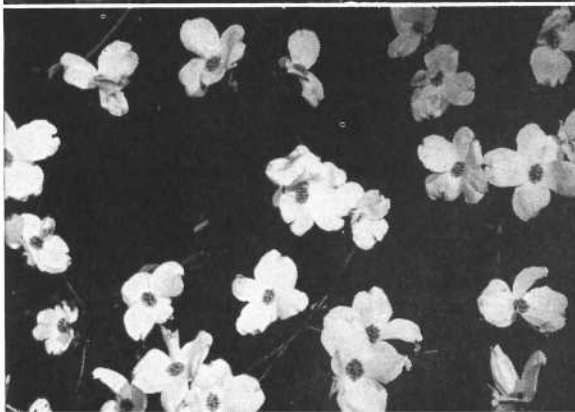
All of these make good substantial emergency feeding shelters which can be economically provided from materials easy to acquire. Where there are long expanses of fields with shelter potentials far removed from each other, the lean-to kind of shelters like those made of cornstalks, should be placed at intervals to provide additional protection when the birds are on the move.

Many unique devices have been used for sheltering wildlife; discarded culvert pipes, hollow logs or old tile laid in a brush or briar thicket and covered heavily with stones and brush makes good escape cover.

Discarded wagon beds or auto bodies placed on logs or other suitable foundation material that will raise them slightly off the ground make excellent semi-permanent shelters if they are placed advantageously. Naturally the vehicles should be covered profusely with brush. These and other means of artificially protecting wildlife are but a few of those illustrated in this booklet. People's ingenuity in devising methods of feeding and sheltering wildlife is second only to their interest in their bird neighbors. If a reader of this publication has developed some successful feeder or feeding station not mentioned under this cover we would welcome a description and an illustration thereof. Through this kind of cooperation this pamphlet can be improved and made useful beyond our expectations.

There are other ways in which to care for birds in winter. Corn and other grain left standing along fencerows or near good woodland cover

provide excellent outdoor cafeterias. Within the woodlands themselves whole corn can be placed on sharpened sticks well above the snow. Basket and crib feeders are ideal for wild turkeys. The basket feeder also is used quite extensively by the gray squirrels. Where both squirrels and turkeys utilize the same feeder, pickings are made very easy for the big birds with the long beards. The squirrels sit atop the basket removing the core from the grain, and drop the kernel to the ground where it is quickly gobbled up by a hungry turkey. Whole corn or scratch grain should be used in servicing these feeders. It should be placed in the shelters early enough ahead of cold weather so birds within the area will learn where they can find food and shelter before the emergency arises.



(Top left)—Black, Alder or Winterberry. (Ilex verticillata.)

(Top right)—White-breasted nuthatch at sunflower feeder.

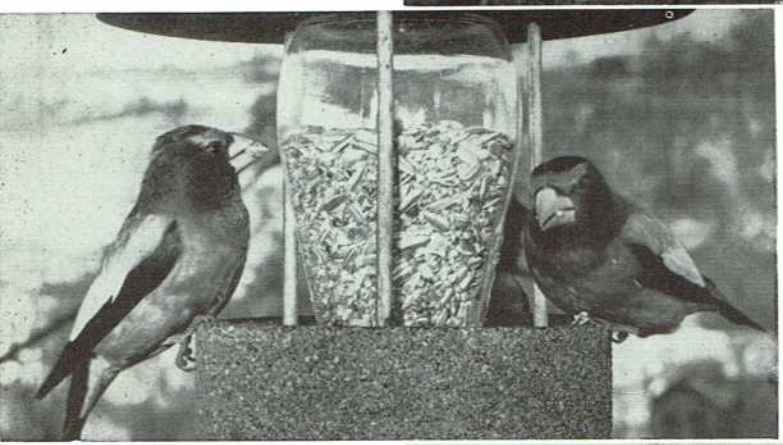
(Right)—Flowering Dogwood. (Cornus florida.)

Photos by Hal H. Harrison.

Children watching birds at window feeding tray.

Photos by Hal H. Harrison.

Cardinal cracking sunflower seeds at winter feeder.



Rare winter visitors—evening grosbeaks at feeder.

Many flocks of wild turkeys were fed by this sportsmen's club.

Birds That Commonly Visit Feeding Stations

Hairy Woodpecker
Downy Woodpecker
Bluejay
Chickadee
Tufted Titmouse
White-breasted Nuthatch
Starling
English Sparrow
Slate-colored Junco
Tree Sparrow
Song Sparrow
Cardinal

Birds That Occasionally Visit Feeding Stations

Bobwhite Quail
Ringneck Pheasant
Brown Creeper
Evening Grosbeak
Purple Finch
Redpoll
White-throated Sparrow

Planting Food and Cover—The game birds are protected except during the periods when they may be legally hunted. Some of them are migratory and are protected by the Federal Government under the Migratory Bird Treaty Act Regulations; others are resident and as such are subject to state regulations.

The migratory species include the ducks, geese, swans, brant, rails, coots, gallinules, plovers, snipe, woodcocks, sandpipers, yellow-legs, curlews, mourning doves and grackles.

The resident species include the wild turkey, ruffed grouse, ringneck pheasant, bobwhite quail, and the Hungarian partridge.

The ducks are numerous and should also be classified. There are those which are generally found on the rivers, creeks and ponds. They are known as surface feeders and include the mallard, black duck, gadwall, baldpate, pintail, green-winged teal, blue-winged teal, shoveler and wood duck.

The other duck group consists of bay or sea ducks which are the diving species. They will also feed in the fresh water streams. They include the redhead, ring-necked duck, canvasback, greater scaup, lesser scaup, American goldeneye, buffelhead, old squaw, ruddy and the hooded, American, red-breasted mergansers.

Pennsylvania is not the best duck hunting state because it lacks the water areas which many other states posses. Nonetheless it is contained within the important Atlantic Flyway and its streams, lakes and ponds are important stopping places for waterfowl to rest and feed. The Pennsylvania Game Commission is doing everything it can on the Game Lands to provide more water and marsh areas for these migrants. One of the largest waterfowl sanctuaries in the eastern part of the U. S. is maintained by the Commission near Linesville, Crawford County. It is known as the Pymatuning Waterfowl Sanctuary and it boasts a fine natural history museum in which all of the waterfowl, marsh and shorebirds of the Commonwealth are displayed.

Others can also help to encourage waterfowl not only to stop over for rest and food, but often to nest.

To render this kind of assistance often means lots of physical effort and sometimes considerable expense. Landowners and sportsmen's organizations who own large club grounds can contribute most to such a program. This can be done by establishing farm ponds and improving marsh areas and planting them to the aquatic and other food producers that will attract waterfowl.

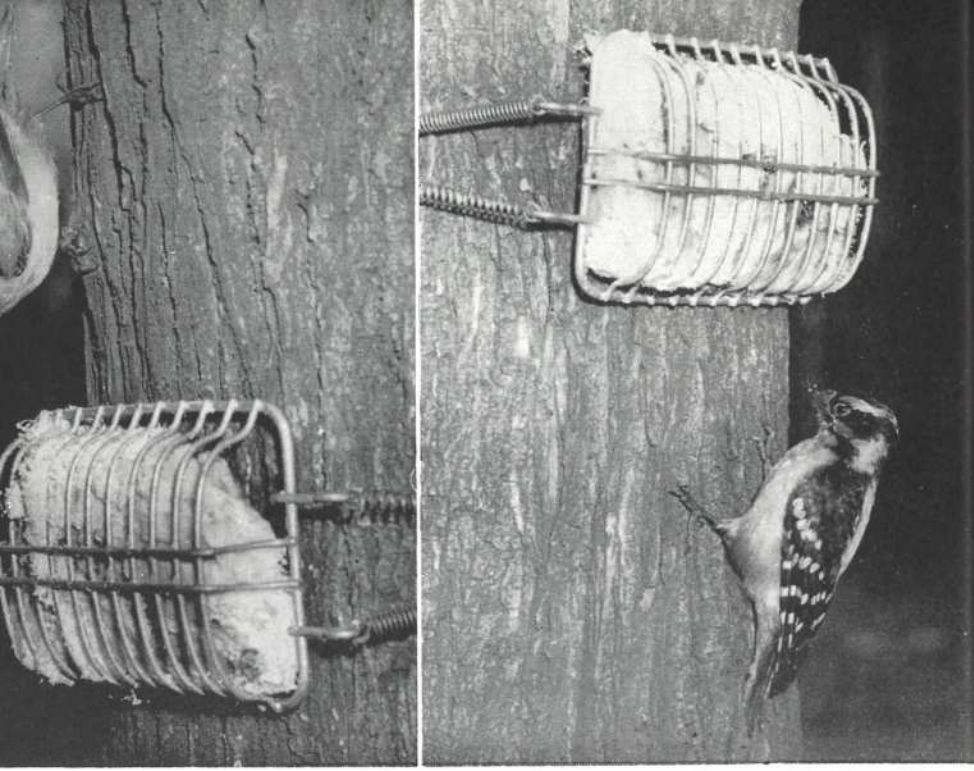


Photo by Hal H. Harrison.

birds approach the same soap dish suet feeder—a white-breasted nuthatch comes down the tree headfirst, left, while a downy woodpecker hitches himself up the tree, right.

Following is a list of the more important aquatic plants that may be seeded or planted to improve food and cover for wild ducks, geese and other wildlife that may be found around ponds and marshes.

Wapato (duck potato)	1200 tubers per acre in marshy area and mud flats.
Wampee (duck corn)	10 lbs. of seed per acre on swampy land or in acid water 6" to 8" deep.
Millet	20 lbs. seed per acre on moist soils and mud flats.
Nodding Smartweed	40 lbs. seed per acre on exposed mud flats.
Sago Pondweed	1200 tubers per acre on sandy or mud soils—Alkaline water 1½ to 8 feet deep.
Wild Celery	30 lbs. seed per acre in 1-6" of water. Hard fresh water or slightly brackish.
Wild Rice	60 lbs. seed per acre in a few inches to 2 feet of water.
Giant Burreed	10 lbs. seed per acre in muddy spots.
Water Shield	700 plants per acre in 1-6" of water.
Three Square Bulrush	1200 roots per acre in less than 2 feet of water.
Hard Stem Bulrush	1500 plants per acre in less than 3 feet of fresh water.
Duck's Meat (surface floating)	5 bu. of plants covers one acre of water.

For those who are interested in helping the Commission in its waterfowl restoration program there is a list of useful publications that deal specifically with habitat improvement in the appendix of this bulletin.

One bit of information that might prove valuable at this point is the promotion of vegetation on the embankments and spillways of farm ponds to prevent erosion and provide food for game. A soil treatment of 1,000

lbs. of 10-10-10 fertilizer and 3 tons of lime per acre is recommended. The areas should then be planted with the following mixture:

Kentucky blue grass	12 lbs.
Red Fescue	12 lbs.
Red Top Clover	6 lbs.
Perennial Rye Grass	10 lbs.
White Dutch Clover	2 lbs. or a total of 42 lbs. per acre.

Another group of game birds are the upland game species which include the wild turkey, grouse, pheasant, partridge and bobwhite quail. These birds are valuable not only recreationally but economically. The farm game species particularly feed largely upon waste grains, weed seeds and insects, although they also consume berries from many shrubs and vines, as well as the tender leaves from native plants and farm crops such as clover.

Although the Game Commission carries on an extensive program for all wildlife on the nearly one million acres which it owns and controls for the sportsmen, it must depend largely on sportsmen, farmers and interested individuals to augment its program on the privately owned lands within the Commonwealth. Many landowners are already carrying on modern practices which are benefiting both crops and wildlife, and others are demonstrating a keen interest in this proven cooperative effort. For them, and for the many hundreds of people who, in recent years, have been moving out of the cities and larger towns into urban and even country environment, where they may possess anywhere from one-half to ten acres, the following habitat improvement suggestions are directed.

Many trees, shrubs and vines which produce food and cover for game birds are also very attractive and ornamental because of their flowers and their fruit. Others provide dense cover. A list of the most common and valuable species which can be planted to attract game birds and other wildlife including songbirds follows:

Evergreen Trees

Red Pine
White Pine
Scotch Pine
Hemlock
Austrian Pine
Banks Pine
Norway Spruce
White Spruce

Other Trees

White Oak
Red Oak
Black Walnut
Shellbark Hickory
Black Locust
Apple
Cucumber
Mountain Ash
Persimmon
Sugar Maple
Tulip Poplar
Mulberry
Willow
Chestnut (Asiatic)

Shrubs

The most important shrub species recommended for conservation plantings in Pennsylvania:

Multiflora Rose (thorny type)
Bicolor Lespedeza
Blackhaw (Viburnum)
Hazelnut (American)
Tatarian Honeysuckle
Autumn Olive
Filberts (Hazelnut)
Gray Dogwood

Bayberry	Coralberry
Privet (Regel or Amur)	Silky Dogwood
Arrow-wood	Highbush Cranberry
Basket Willow	Red Ozier Dogwood

On the better agricultural farms, Multiflora Rose should be planted only where regular farming practices will limit the possibility of its spreading to adjoining fields. It does not grow well in shade or on wet soils.

Other species adapted to special conditions, but difficult to establish or of less value in conservation plantings, are elderberry (American elder), flowering dogwood, sumac, blackberry, red chokeberry, black chokeberry, witch hazel, thornapple (hawthorne) and choke cherry. These occur naturally on many farms and should be favored in border cuttings, etc. They may be successfully transplanted from one area on the farm to a wildlife planting if extreme care is used in lifting and transporting the stock.

Although few vines are available in local nurseries, the fox grape and American bittersweet produce good food and cover for wildlife and should be included in conservation plantings on the farm.

Wood Duck Nesting Boxes

Since the wood duck nests in trees and in man-made boxes the preservation of den trees on the one hand and the erection of man-made homes on the other hand are projects in which a great many persons can engage. Where no den trees occur within a reasonable distance of water, boxes should be provided. Good locations are in the marshy areas bordering lakes, ponds and streams. The diagrams which appear elsewhere in this pamphlet show illustrations and include specifications for constructing wood duck nesting boxes. The construction and placement of these boxes have been ideal projects for 4-H Clubs, Future Farmers of America and Boy Scouts. A great many of these man-made homes have been effectively placed through the efforts of these youth organizations.

Attracting Songbirds to Your Home and Garden
Building Bird Houses

With the introduction of the starling into the United States, many of our native hole-nesting birds entered into keener competition for nesting sites. The erection of bird houses, especially those constructed for bluebirds, has no doubt offered some help to our less pugnacious native species.

Here again, the fun of watching a family of bluebirds in one's own backyard certainly repays many times the trouble of making and erecting a home for them.

Let us concede, then, that the attraction of birds is a project of mutual benefit . . . we help the birds and they repay us immediately with hours of happiness . . . precious hours in a busy world!

Not all birds will build nests in man-made houses. The ones that will, however, are generally common species, and the chances of attracting them are good, providing a few simple rules are followed in the construction and placing of bird houses.

To begin with, bird houses should always be built from the bird's point of view, not yours. You may feel that a fancy house painted bright red would look very "cute" in your garden, but the birds will probably feel that a lot of bric-a-brac and the bright color are too conspicuous. Houses

Game Commission Photo.

Sportsmen erect modern metal wood duck nesting boxes.

should be constructed simply and should be painted brown or dull green to blend with the surroundings.

The object in building bird houses is to offer a substitute in your yard for the natural cavities far afield. The more these houses resemble natural nesting sites of the species, the greater chance of attracting tenants. Indeed, the finest bird houses I have ever seen were natural cavities brought from the woods and erected in the yard. Everyone cannot transplant hollow trees to their grounds, but covering the outside of a bird box with strips of bark is an aid in making it look natural.

It is important, too, to consider the bird's point of view in the physical dimensions of the box. You will have little chance of attracting house wrens to a box with a three-inch opening, and owls would hardly accept your offering if the depth of the cavity were only a few inches. The chart accompanying this chapter should be followed closely.

Purple martins are the only birds that should have a house of more than one compartment. Make all others single. And do not place too many boxes in a limited area. Many will remain unoccupied if you do. The "territorial instinct" is strong in birds during the breeding season, and male birds jealously guard their domains against intruders. House wrens have a habit of plugging the openings of all wren boxes in the areas to discourage other pairs from attempting to occupy the same district.

If you have cats in your neighborhood, by all means protect your bird houses, and your feeding trays from them. Tin or wire guards placed on poles or tree trunks will serve usually if they are placed high enough that cats cannot clear them by jumping from the ground. Although YOUR cat would not think of eating a bird, remember that all other cats do eat birds whenever they have a chance.

Provide for cleaning a bird box by having one section on hinges so it may be opened after the nesting season. Remove the old nest in the fall. Make the top rain-proof. Sloping roofs, covered with water-proof material are best. Use wood at least ¾ inch thick.

Ventilation can be provided in bird boxes by boring two small holes through the sides near the top. If the bottom of the box extends beyond the sides, it will form a base upon which some water will invariably collect or freeze in the crack between the bottom and the sides and force them apart. It is a wise plan to bore a few small holes in the bottom of the box to allow any water, which might find its way inside, to drain off.

Fully as important as correct construction is the correct placing of bird houses. A box at the top of a pole, with an unhampered approach and exit area, is generally best. Houses for woodpeckers do well placed on the trunks of trees, however. The chart, giving the correct heights, should be followed closely. A bluebird house 20 feet in the air will not attract bluebirds anymore than a box for nuthatches placed near the ground will attract nuthatches.

House wrens are the easiest birds to attract. They nest in almost any conceivable type of home, from tin cans, swimming trunks, bathrobe pockets and old shoes to elaborate little mansions. Be sure to make the opening exactly one inch in diameter. Nail it to a pole six feet to ten feet above the ground.

Bluebirds arrive in Pennsylvania in March and start looking for a nesting site quite early. Be sure to have houses in place by late winter. Place well in the open and at the top of a pole, five to ten feet from the ground.

Robins prefer protected shelves or trays with three open sides. These can be placed under window sills, under porch roofs, on poles or in trees. Robin shelves make ideal winter feeding stations.

Woodpeckers, chickadees, titmice and nuthatches usually prefer to fashion their own homes or use abandoned sites of each other or natural cavities. At times, however, they are attracted to man-made boxes. Bark covered houses look quite natural. Hollowed out limbs make excellent houses.

Purple martins are attracted to nesting boxes, but not to all by any means. They live in colonies, so a properly constructed house should contain at least six compartments, each made on the specifications given here.

BIRD HOUSE DIMENSION CHART

Species	*Floor of cavity*	*Depth of cavity*	*Entrance above floor*	*Diameter of entrance*	*Height above ground*
	Inches	Inches	Inches	Inches	Feet
Bluebird	5 x 5	8	6	1½	5-10
Robin	6 x 8	8	(3 sides open)		6-15
Chickadee	4 x 4	8-10	6-8	1⅛	6-15
Titmouse	4 x 4	8-10	6-8	1¼	6-15
Nuthatch	4 x 4	8-10	6-8	1¼	12-20
House Wren	4 x 4	6-8	1-6	1	6-10
Tree Swallow	5 x 5	6	1-5	1½	10-15
Purple Martin	6 x 6	6	1	2½	15-20
Crested Flycatcher	6 x 6	8-10	6-8	2	8-20
Flicker	7 x 7	16-18	14-16	2½	6-20
Downy Woodpecker	4 x 4	8-10	6-8	1¼	6-20
Screech Owl	8 x 8	12-15	9-12	3	10-30
Sparrow Hawk	8 x 8	12-15	9-12	3	10-30
Wood Duck	10 x 18	10-24	12-16	4	10-30

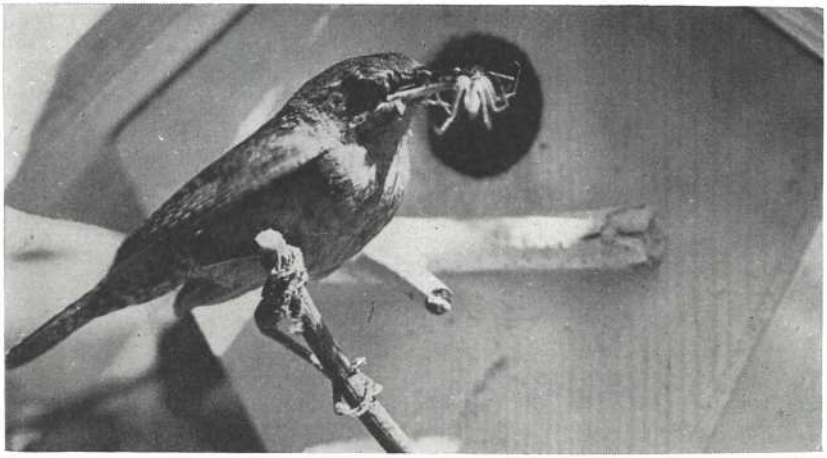


Photo by Bryant Tyrrell.

House wrens are easy to attract to man-made boxes. This parent wren holds a daddy-long-legs in its bill.

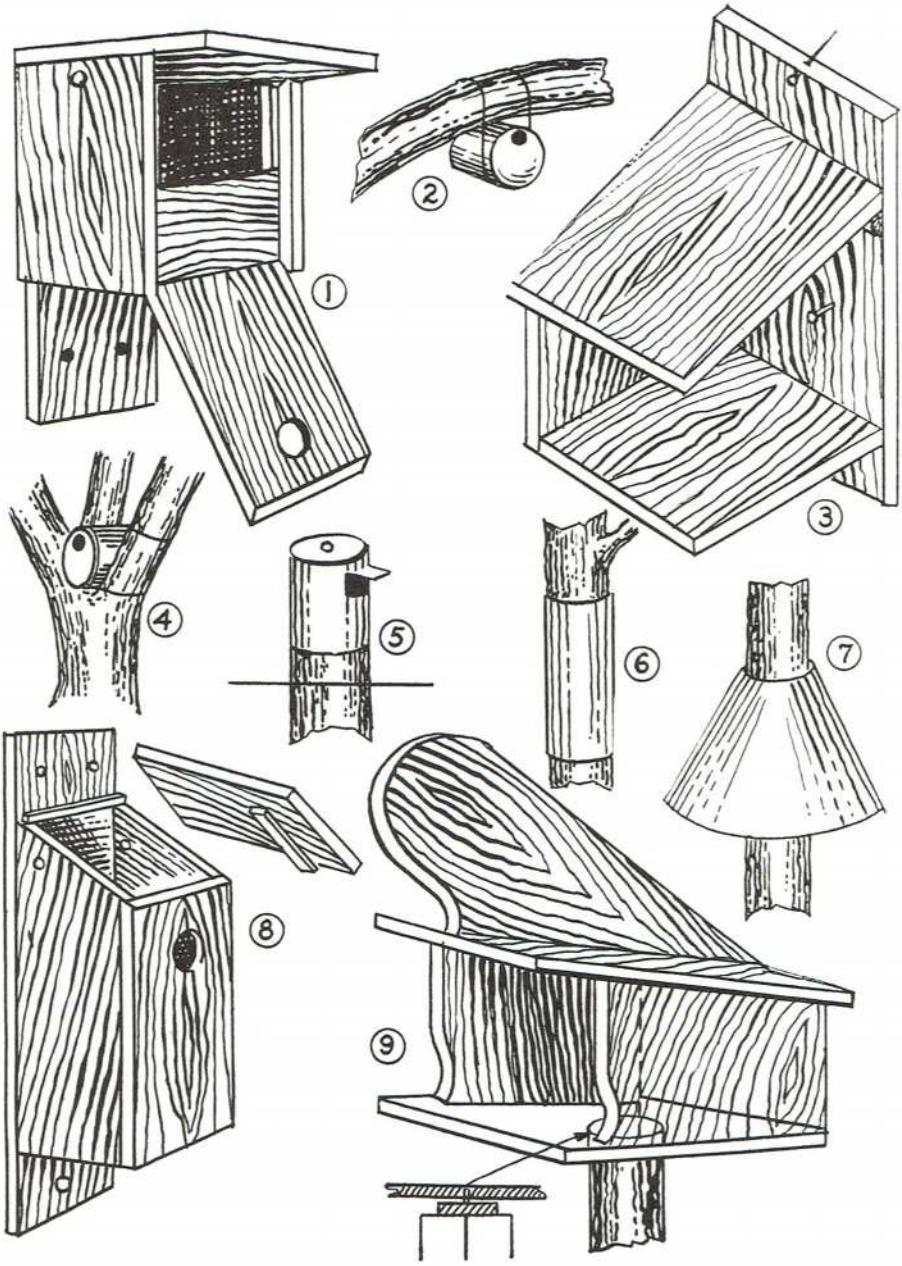


Fig. 1. This type box, hinged at the bottom, is very easy to clean out. Figs. 2, 4 and 5. Tin cans conveniently placed often attract wrens. Fig. 3. This outdoor shelf can be used either as a nesting platform or as a feeding counter, preferably the latter. Figs. 6 and 7. Tree guards prevent cats from climbing to the nest box. Fig. 8. A box with a removable top has many advantages. Fig. 9. Weather vane feeding shelf.

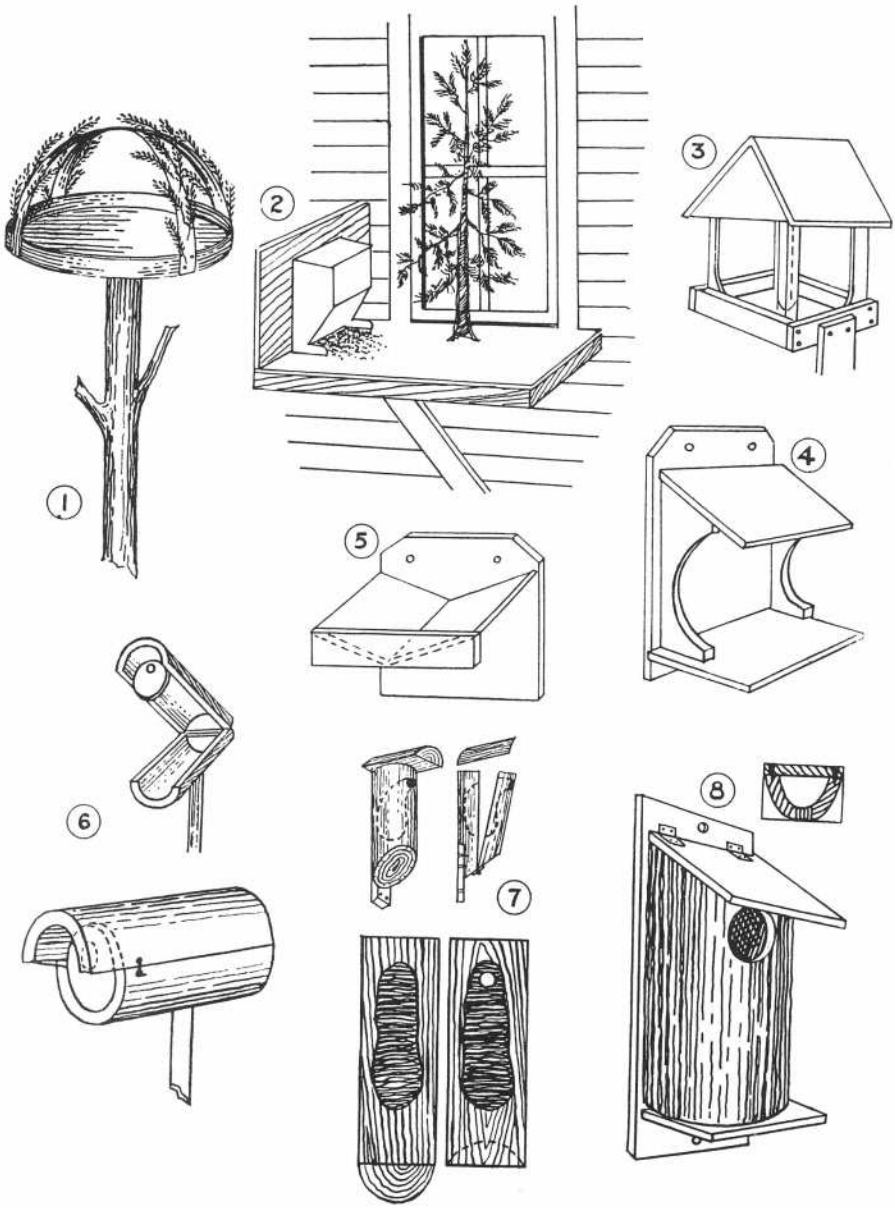
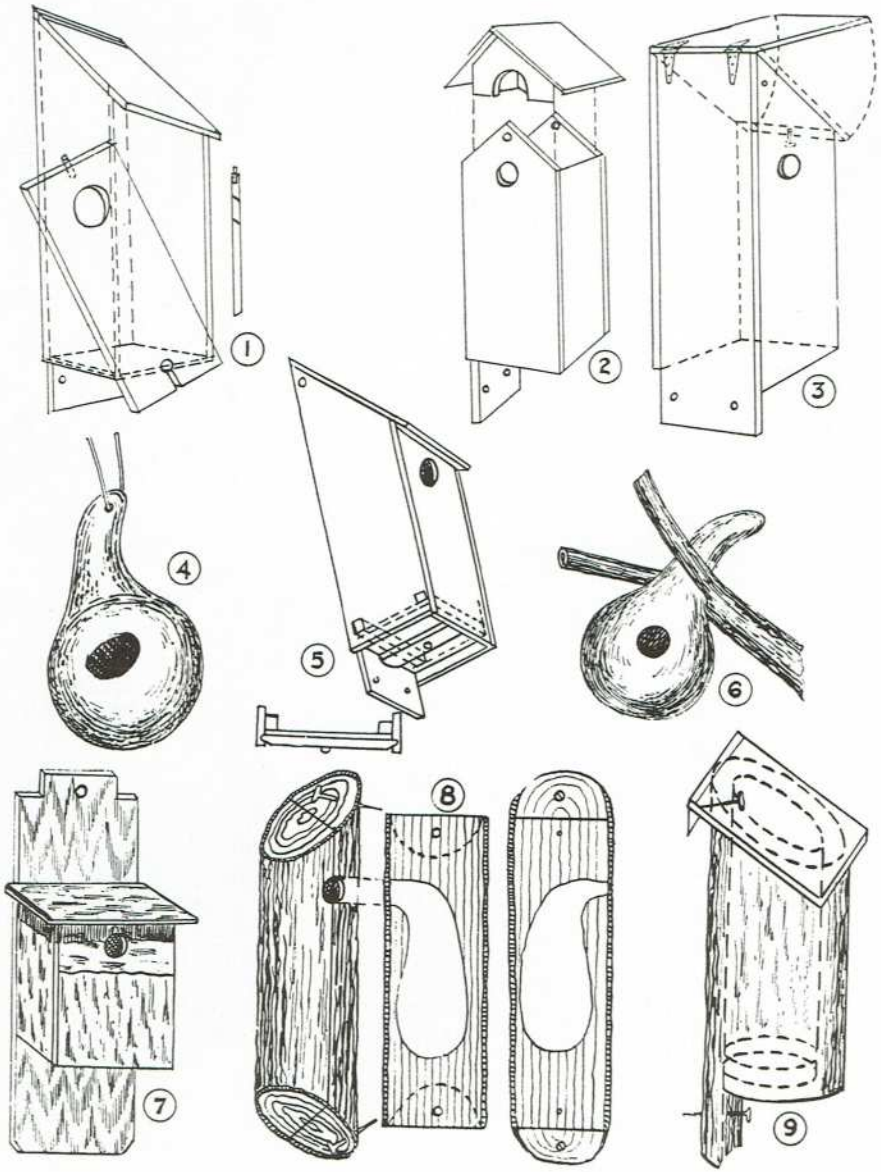


Fig. 1. Food tray. Fig. 2. Windowsill feeding counter. Figs. 3, 4 and 5. Feeding shelves; sometimes, if all sides are open as in Fig. 3, robins will nest in them. Fig. 6. This cleverly devised nest box is practical from many standpoints. Fig. 7. A dead limb sawed off, cut in half lengthwise and hollowed out part way on each side makes a good box for cavity nestors. Fig. 8. A rustic, hinged top box is also desirable.



Figs. 1, 2, 3 and 5. Here are some other examples of removable fronts, tops, bottoms, etc., any one of which is decidedly advantageous. Figs. 4 and 6. Gourds make especially good homes for wrens and martins. Fig. 7. Rustic box for bluebirds or wrens. Figs. 8 and 9. Rustic flicker boxes.

Winter Feeding

In the autumn and early winter, there are two special kinds of bird watchers; those who bid the birds goodbye until next spring; and those who start preparing to enjoy birds all winter.

"But," you ask, "how can I enjoy birds all winter?"

The answer is simple: "Feed them!"

And the time to start feeding is not when winter's snows have arrived and ice coats the trees and shrubs, for then, Pennsylvania's winter birds already know where they can find food . . . or it is too late. The time to start feeding is in the fall when birds are on the move, scouting for a source of winter food. Attract them then to your grounds and they will remain with you until spring, and sometimes throughout the summer, too.

You may attract birds in winter with but little effort. A feeding station in your yard need be nothing more than a board with a ledge, placed in a sheltered place on a post, in a tree, or just outside a window. You may prefer a more elaborate feeder and a more costly one, but as far as the birds are concerned, the feeder does not matter. It's a REGULAR and DEPENDABLE supply of food that counts.

As to the food you give your birds, let your pocketbook be your guide. Table scraps, beef suet and scratch feed will do nicely if you find your budget will not permit wild bird seeds and sunflower seeds. Oatmeal is relished by the birds, too. Dried bread, meat scraps and left-over hot cakes will be welcome.

To understand better your feeding problems, let us divide all winter birds into two classes according to diet; seed eaters and insect eaters.

Naturally, you cannot supply insects in the winter for the latter, but you can offer a worthy substitute . . . suet. Your butcher will supply you with suet at a nominal charge. Indeed, the average feeding station will not require more than one dollar's worth of suet during an entire winter. Peanut butter is another excellent decoy. Paste it on a limb.

There is a greater selection for the seed eaters; wild bird seeds, sunflower seeds, hemp, millet, cracked corn and scratch feed.

Some birds, like chickadees, nuthatches, titmice and bluejays eat both seeds and suet. The woodpeckers and the creepers come only for the suet, while the members of the sparrow family are exclusively seed eaters.

In feeding suet, it is well to confine the meat in some sort of a container. I have found a soap dish turned upside down and fastened to a tree trunk to be very satisfactory. If you wish, you can merely tie the suet to a limb. By confining it, however, you eliminate theft by dogs, cats and squirrels. You also compel the birds to stay where you may watch them while they feed.

A word of caution: Do not start to feed wild birds unless you intend to continue all winter. The reason is obvious. When birds learn that you place food for them every day, they come to depend upon you. Then, if you quit suddenly during the winter, they are forced to search elsewhere. If they do not find food to replace yours quickly, YOUR birds may die because you failed to keep faith.

Don't pity the birds in sub-zero weather. They are not cold if they are well fed. It is the starved or hungry birds that perish in freezing weather. The normal body temperature of a healthy wild bird is close to 110 degrees. It requires a great deal of fuel to maintain that temperature, and food is fuel.

Photo by Hal H. Harrison.

Winter feeding is fun for everyone.

Game Commission representatives and members of sportsmen's clubs who feed game in the open, in the forests, and at the lakes, reach birds that the average home owner cannot hope to feed in winter. For many years, the Pennsylvania Game Commission has fed tons of corn on the cob to wild geese, mallard and black ducks in the Pymatuning Refuge. During each winter several thousand waterfowl remain at Pymatuning.

During the same period, Game Feeding Clubs dropped corn from airplanes regularly to flocks of wild turkeys and other game throughout Pennsylvania counties. Junior and Senior Sportsmen's clubs and Boy Scouts throughout the state maintain regular feeding programs during each winter, thus saving the lives of many wild creatures.

Planting Ornamental Trees, Shrubs and Vines

Although birdhouses and bird feeders will attract birds at certain times of the year, there is something else that will attract them all year round. That is food and cover. They will nest in man-made houses, but they prefer to nest in natural places such as trees, shrubs, vines or open fields. They will eat the food from the feeder, but they prefer the natural wild fruits, seeds and insects.

People who plant the right kind of ornamental trees, shrubs and vines in their backyards or gardens are sure to attract many songbirds to their small private sanctuaries.

It does not require too much space devoted to shrubs to attract some birds, but the shrubs should be planted so that they cover a solid area from the ground to seven or eight feet high.

Food Shrubs—Dogwood may grow as a shrub or a small tree, depending upon what kind it is, but any kind of dogwood provides good food for birds. In spring it has attractive blossoms. In winter some kinds have colorful stems and twigs. More than ninety kinds of birds are known to feed on the dogwood berries, including quail, flickers, bluebirds, thrashers, robins, thrushes, grosbeaks, sparrows and finches.

Wild rose makes an attractive hedge or fence row in a yard or garden. It grows as a low shrub and can be trained to a trellis. When the blossom is gone, a red seed pod remains and that is what the birds eat. Grouse, quail, pheasants, thrushes, robins, cardinals and about forty other kinds of birds feed on the seed pods of the wild rose.

Elderberry is another shrub that is used for food by quail, woodpeckers, kingbirds, phoebes, mockingbirds, bluebirds, vireos, grosbeaks, thrushes and many others. The elderberry bush has a purplish black fruit and some birds will nest in elder thickets if the shrub is big enough to provide good cover.

Blackberries and raspberries are common fruits that we eat. Birds like them, too. Blackberries or raspberries in a yard or garden may attract at least 150 different kinds of birds, among which are thrushes, quail, bluebirds, robins, grosbeaks, kingbirds, waxwings and orioles.

Holly is an attractive plant for any yard as the leaves stay green all winter. At least forty different kinds of birds are attracted by holly berries.

Honeysuckle, a vine, has fragrant blossoms in summer and attracts robins, bobwhites, pine grosbeaks, white-throated sparrows, catbirds, brown thrashers, hermit thrushes, purple finches and others.

Cover Shrubs and Trees—As the food shrubs serve two purposes—beauty in the yard as well as food for the birds, other shrubs and trees provide nesting places and beauty.

The most popular cover shrubs and trees are those that do not lose their leaves in winter, such as hemlock, cedar, spruce and pine.

Hemlock makes an attractive hedge, as it grows quite densely when the tops are cut back. It provides good nesting sites and cover for several kinds of birds and food for winter birds such as siskins and crossbills.

Cedar also makes a good fence row or hedge. It provides good nesting sites for birds and food for at least fifty different kinds including robins, waxwings, thrushes, bluebirds and grosbeaks.

Norway or white spruces, when planted close together along fence rows or in clumps, make good nesting places for robins, jays, doves and grackles. The seeds in the cones provide food for winter birds such as chickadees, siskins and crossbills.

There are five different kinds of pines recommended for planting to attract birds. The red pine, white pine, Scotch, Austrian and banks pines are all excellent for providing dense cover. They also furnish food for the winter birds.

Yew, a low growing evergreen, provides shelter and also food.

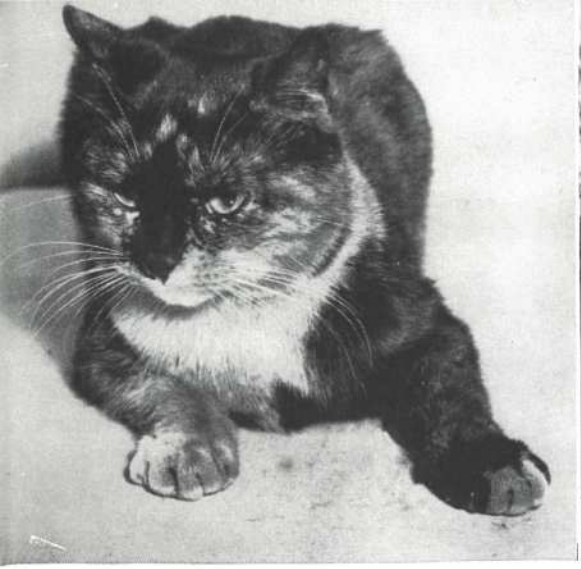
A dense clump of rambler rose in the yard is a favorite nesting place of song sparrows. The rambler rose thus produces beauty—and music as well.

Enemies of Birds

Birds have numerous enemies. Foxes, weasels, raccoons, opossums, skunks, minks and snakes will prey upon them. Sometimes they take the young, but more often they eat the eggs. The balance of nature decrees that in order to survive some creatures must necessarily prey upon other creatures. Nature usually compensates by producing larger numbers of those which are preyed upon.

Under normal conditions the number of creatures which live upon one another effect a proper balance because of this wide variation in their productive ability. But, where an over-abundance of some forms exists, such as the predatory forms, then the more desirable species such as the game and songbirds cannot offset the reduction made in their ranks by predators despite their productivity. When this situation arises man must step in and control the species which have no natural enemy to control them. Trapping does more to reduce predatory animals than any other method; that and providing the natural cover in which the desirable species can hide from their enemies.

One thing which is too often overlooked when trying to effect control methods is that such remedial measures can be over emphasized. Wild-



No. 1 enemy of birds—the common cat. Pennsylvania cats are alleged to kill an estimated 8,500,000 birds annually.

Photos by Hal H. Harrison

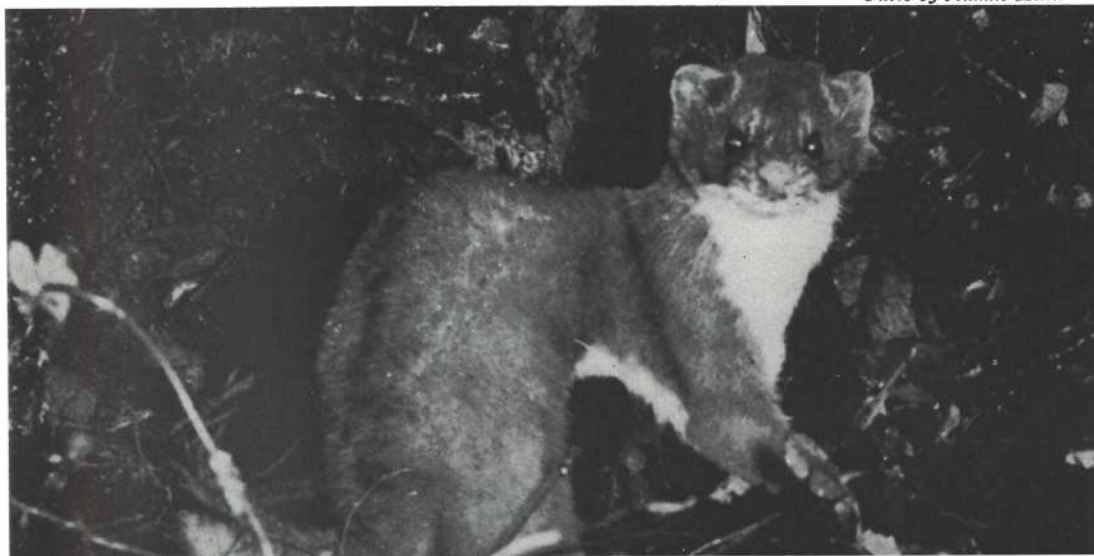
Parents are responsible for the proper use of firearms by their children.

life's ability to remain wild is predicated only on the fact that it has *some* enemies; otherwise it would not remain wild. But it dare not have *too many* enemies.

Game and songbirds have domestic as well as wild enemies. Of them the feral house cat is probably the worst culprit. The toll they take is tremendous for they hunt every day of the year. To safeguard wrens and bluebirds the only alternative is an umbrella of zinc, tin or other pliable metal placed just below the nesting box. This protective shield should be wide enough in its outer diameter to keep a cat from reaching the edge.

Common weasel.

Photo by Johnnie Mittl.



CHAPTER IX

INTERESTING FACTS AND FALLACIES ABOUT BIRDS

Questions and Answers

Q. How long do birds live?

A. Very few birds die a natural death or die of old age. Their enemies are many, and the songbird that lives beyond four or five years is the exception. Larger birds, like hawks, owls, geese and gulls, will average a longer life, and birds in captivity, shielded from their natural enemies, will live longer than those in the wild. From the return of 621 banded songbirds, the average age was computed at less than three years.

Q. How fast do birds fly?

A. Songbirds travel between 20 and 35 miles per hour; ducks and geese between 40 and 60 miles an hour. Top speed of a homing pigeon is 55 miles for four hours. Swifts, fastest of all birds, have been clocked as fast as 200 miles per hour.

Q. How much does a bird weigh?

A. The lightest bird is the hummingbird, which weighs about one-twelfth of an ounce. Most warblers, sparrows and birds of similar size weigh from one-third to two-thirds of an ounce. Bluebirds, catbirds, towhees, etc., weigh approximately one ounce; robbins about two ounces; flickers, three ounces; mourning doves, four ounces; kingfishers, five ounces; screech owls, six ounces; bobwhites, seven ounces. A crow weighs about one pound and a quarter; a herring gull about two pounds; a mallard duck, three pounds; an osprey, four pounds; and a Canado Goose, about 13 pounds.

Q. Are birds' eyes different from ours?

A. Yes, they are round. Owls are the only birds with eyes turned forward like ours; others have one eye on each side of the head so they may look two directions at the same time. Birds have three eyelids; two like ours (except that a bird usually closes its lower lid, not its upper). The third lid is inside the other two. It is called a "nictitating membrane." It is a thin skin that moves across the eye. Birds can see much farther than we can.

Q. Do birds have ears like ours?

A. Yes, but they are not seen because they are covered with feathers. They lie behind and a little below the eyes. The "ear tufts" on owls are not ears; they are ornaments. The real ears are located elsewhere on the head.

Q. Why do birds have tails?

A. A tail acts as a rudder; as a brake to check speed when alighting; and as a balancing agent when perching. Some birds use their tails in courtship display, especially by fanning, like the ruffed grouse, turkey and peacock.

(Top left)—Birds lay from 1 to 20 eggs. This sora rail laid 12. (Top right)—The end of a woodcock's bill is hinged, thus permitting it to grasp earthworms while probing in marshy ground. (Center left)—The great-horned owl is the earliest nesting bird in Pennsylvania. It sometimes lays its eggs in February. (Center right)—Bats, like this little brown bat, are mammals, not birds. And they will not get in your hair. (Center right)—Male marsh wrens, like this long-billed marsh wren, build many dummy or "cock" nests that are never used. (Bottom left)—Protected birds may not be kept as pets. (Bottom right)—It's the three outer primary feathers of a woodcock's wing that makes the whistle when the bird flushes.

Q. Can all birds fly?

A. No. There are flightless birds, like the ostrich and penguin.

Q. Since birds do not have teeth, how do they digest their food?

A. Birds have gizzards which contain grit. Here, the food is ground.

Q. How many different kinds of birds are there?

A. About 25,000 all over the world. About 800 species and sub-species occur in the United States. In Pennsylvania, approximately 300 different birds have been recorded.

Q. Why don't water birds, like ducks, become chilled in icy water?

A. They have very thick down under their feathers which keeps the water away from their bodies.

Q. Why don't birds fall when they go to sleep while perching?

A. There is an automatic action in the tendons of the birds' feet that locks them to their perches when they go to sleep.

Q. Is a bat a bird?

A. No, it is a mammal. Bats have teeth and their body is covered with fur like a mouse. And they do not get in your hair!

Q. Why do birds sing?

A. Not to please human beings to be sure. It is generally agreed that birds sing for two principal reasons: to attract a mate; and to notify other males of the same species that a territory has been established and that encroachments will not be tolerated. And I often wonder if birds don't sing for the sheer joy of it!

Q. Do birds mate for life?

A. Most birds mate for one season only. Some, like the wrens, sometimes mate for only a single nesting during a season. Others, like pheasants, grouse, red-winged blackbirds and house wrens, are polygamous. Male ducks usually desert their mates after egg-laying is completed. The hummingbird, although not known to be polygamous, deserts its mate after the eggs are laid.

Q. Which selects the nesting site, the male or female?

A. The actual site is selected by the female, but it must be within the boundaries of the territory of the male to which she is mated. The territorial boundaries are fixed by the male. There are of course exceptions to this rule.

Q. Do birds use the same nest more than once a year? Do they use it the next year?

A. Some birds, like phoebes, bluebirds and wrens, use the same nest for more than one brood during a single season. Most birds do not. Very few birds occupy the same nest more than one season. Exceptions are eagles, owls, hawks and some hole-nesting birds, like woodpeckers.

Q. How many eggs do birds lay? How long do they incubate?

A. From one to twenty, depending upon the species. The average songbird lays from three to five, usually four. Incubation varies with the species, but 12, 13 or 14 days is normal for a songbird. Chicken eggs hatch in about 21 days; pigeon's eggs in 17 days; duck's eggs in 28 days. The eggs of the emu, an Australian bird, take about 10 weeks to hatch.

Q. Why are some eggs colored and some white?

A. It is believed that the eggs of all birds were white at one time as the eggs of all reptiles are today. At that time they were buried and needed no protective coloring. During the evolution of birds, when nests were built in the open and the eggs exposed, they took on protective coloration. The eggs of some species never have been exposed. They are still white. Woodpeckers lay white eggs in dark cavities. Kingfishers lay white eggs at the end of underground tunnels. Not all hole-nesting birds lay white eggs, however. The house wren, chickadee, titmouse, nuthatch and bluebird are examples, but it is believed that their hole-nesting habits are comparatively recent; that once they did nest in the open. Exceptions to the general rule are numerous. Mourning doves lay two eggs in exposed places and they are pure white.

(Top left)—Cedar waxwing. (Top right)—Pair of scarlet tanagers (male left; female right). (Center left)—Ruby-throated hummingbird at nest. (Center right)—Female Baltimore oriole at nest. (Lower left)—Red-eyed vireo at nest in Butler Co., Pa. (Lower right)—Catbird.

Q. Do both parents incubate the eggs?

A. Although there are exceptions, the general rule is that where the adults are colored alike, they share the incubation; where the male is more brilliantly colored, the female alone does the incubating. A notable exception is the male rose-breasted grosbeak, who not only shares the incubation with his drab mate but often sings while sitting on the nest. The male phalarope incubates the eggs all by himself and papa quail sometimes relieves his missus of the arduous task.

Q. How do birds know which young one to feed first? How do they know when the young have had enough to eat?

A. Parent birds feed the hungriest baby first. The youngster that stretches its neck the farthest, opens its mouth the widest and cries the loudest will be fed first. When the little one has had enough to eat and can take no more, its throat muscles refuse to work; it can accept no more.

Q. How long do young birds stay in the nest?

A. Another condition that varies with the species. Precocial birds, like pheasants, quail, grouse, sandpipers, ducks, etc., leave in a few hours, shortly after they are dry. Altricial birds, hatched naked and blind, are usually in the nest for about two weeks. Some songbirds, like the ovenbird and the field sparrow, are able to leave in about eight days. Birds of prey feed their young in the nest for several weeks.

Q. What shall I do with a baby bird that I found in my yard?

A. Leave it alone. Only on very rare occasions are young birds lost or deserted. The parent birds will take better care of their young than you will.

Q. Why do birds migrate?

A. No one knows for sure, but two theories are popular. One suggests that at one time birds did not migrate; that they were well distributed over all of the continents. Then came the Ice Age and all birds were pushed farther and farther south. With the retreat of the ice, birds returned to ancestral homes to nest, thus establishing seasonal migration. The second theory suggests that all birds once lived in the tropics but that overcrowding, with its subsequent shortage of food, caused many birds to move farther north to nest. After the breeding season, they return to their ancestral home in warmer climates. Surely the shortage of food and the tendency to escape cold weather must be important reasons which influence migration.

Q. Do birds migrate by day or by night?

A. Both, but the majority of birds migrate by night. Strong-winged birds, like ducks and hawks, and birds that find their food in the open, like swallows, nighthawks, chimney swifts and robins migrate by day. Other birds that must search for their food in dense vegetation, migrate entirely by night.

Q. How often do birds molt?

A. All birds molt at least once a year, in late summer or fall. Some birds molt twice a year, although the spring molt is usually a partial one. Songbirds molt their feathers gradually and thus are never flightless. Ducks and some other water birds molt quickly, acquiring an "eclipse" plumage, during which time they are unable to fly.

Q. Which Pennsylvania bird has the most beautiful song?

A. The answer, of course, is a matter of personal choice. I would choose the hermit thrush, but there are those who prefer the mockingbird, wood thrush, brown thrasher or bobolink. For beauty in simplicity, listen some morning at dawn to the delightful song of the wood pewee.

Q. What causes albinism in birds?

A. The whole or partial absence of color pigment results in total or partial albinism. It is quite common in robins, sparrows and blackbirds, although it may occur in any species.

Q. Do hummingbirds have transparent wings? Do they ever perch?

A. The wings of a hummingbird beat so rapidly (up to 200 strokes per second as compared to a pigeon's 8 strokes per second) that they appear blurred and transparent. Hummingbirds have the exclusive ability to fly backwards as well as forward. Yes, they perch, although their feet are weak.

Q. Is it all right to shoot hawks?

A. Absolutely not. All Pennsylvania hawks are protected except three; goshawk, Cooper's and sharp-shinned hawks. Even these three are protected for a two month period in eastern Pennsylvania during the fall migration. These are shy and secretive species that the average person seldom sees. The conspicuous hawks, the ones you see soaring, flying low over the fields and perched on telegraph poles and tree stubs, are all beneficial and are protected by law. Even these three are protected for a two-month period in Eastern Pennsylvania during migration.

Q. I caught a little owl on my porch today? May I keep it?

A. No. Owls with two exceptions (the great-horned and snowy owls are not protected) are protected and may not be kept in captivity.

Q. Do insecticides kill birds?

A. Unfortunately, yes. Be careful with your bug sprays. You may not need them if you are kind to the birds. Inquire from your County Agricultural Agent what sprays are safe to use and when to use them. Remember that many insecticides kill human beings too. And that goes double for small children.

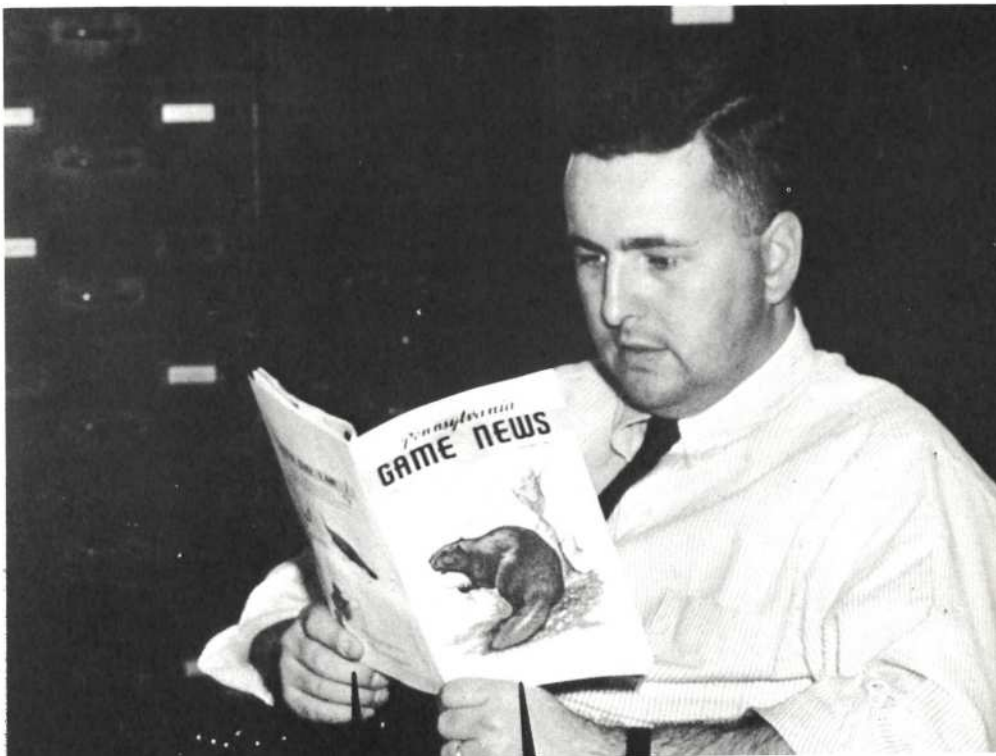
Q. What birds need bird houses most of all?

A. Probably wood ducks, flickers and screech owls in about that order. Wood ducks are easy to attract if you put up wood duck houses. Flickers use flicker houses all winter. Screech owls nest well in nail kegs on posts about fifteen feet high.

Q. When should I clean my bird house?

A. Recent research has shown that bird house cleaning should be done in early spring. By doing this you preserve valuable insect allies—the chalcid flies, which perform wild birds a service by killing off the blow flies that kill so many young birds in the nest. Do not burn the nesting material. Merely empty it on the ground under the bird house.

Much public education concerning Pennsylvania birds is contained in issues of the "Game News," monthly publication of the Commission.



Bird Facts and Fallacies

Chimney swifts that nest in chimneys do not bring bedbugs into the home. Bedbugs are strictly human in their affinity.

Cuckoos, often called "rain crows," do not predict rain when they call. They sing just as often in good weather as in bad.

There has never been any evidence to show that an eagle ever carried off a human baby.

Crested flycatchers usually place a cast-off snake skin in their nests during construction. Ornithologists scoff at the idea that the bird uses the skin to frighten enemies, however.

The whippoorwill and the nighthawk sit lengthwise on a limb, not crosswise like other birds.

Ruffed grouse develop "snowshoes" in winter. These are feather-like projections on the sides of the toes which help support the weight of the bird's body on the snow.

It is not the beating of the wings against a log that causes the noise when a ruffed grouse drums; it is fanning the air with the wings that creates the drumming.

Pied-billed grebes build floating nests in marshes and lakes. The nest is unattached and floats because of the buoyancy of green stems of water plants which serve as a foundation.

Woodpeckers have barb-like tongues with which they spear the larvae of insects found under the bark of trees.

Unlike most ducks that nest on the ground, the wood duck places its nest in hollow stumps and trees. Where these are lacking artificial homes should be provided. The Game Commission will furnish specifications. The hooded merganser and the goldeneye ducks also will use natural tree cavities or man-made boxes.

The water-thrushes are not thrushes; they are warblers.

Male marsh wrens build "dummy" nests that are never occupied by the female. House wrens fill all available boxes and cavities on their territory apparently to discourage other wrens from seeking nesting sites.

The bones of birds are hollow, permitting greater buoyancy in flying and in swimming. Air-sacs under the skin aid water birds in floating.

It is not true that if you breathe on the young in a nest that the old birds will desert. However, disturbing any nest unnecessarily is never advisable.

The feathers of owls are constructed differently from most birds so that the wind makes no noise when passing through them. Thus, the flight of the owl is noiseless.

The shape of the three outer primary feathers on the wings of a woodcock creates the whistling when the bird flushes. The tip of a woodcock's bill is hinged so that it may grasp earthworms as it probes in the soft ground.

Brown creepers build their nests under pieces of loose bark on the trunks of trees.

The Northern shrike impales on thorns or barbed wire the insects, mice, or even small birds that it captures.

Crows, blackbirds, starlings and cowbirds usually walk, not hop.

Both the bluejay and the starling are excellent mimics.

The nuthatch perches and hops upside down on the tree trunks.

Birds are NOT charmed by snakes so that they are unable to fly, thereby becoming easy prey.

Photo by Hal H. Harrison.

Young kingfishers.

The catbird and brown thrasher, especially the latter, are often called "mockers" for they can imitate other bird songs.

Cedar waxwings are the *only* common North American birds that have their tails tipped with yellow.

Birds have fairly well established territories. Usually they are obtained by combat. I have noted this particularly among the egrets. Along the creek where I live the birds fish within a thousand yards of each other. The distance is probably governed by the amount of food available.

Some birds will place a roof over their nests such as the ovenbird and the meadowlark. They enter from the side. The grasshopper sparrow constructs a tunnel of grass outside the nest that looks like a porch.

The cowbird lays its eggs in the nests of other birds. A photograph by a friend of mine shows a yellow warbler that built five stories onto its nest in order to screen out the undesirable cowbird's eggs.

The hummingbird can truly be called the helicopter among birds.

Many birds are protected with colors that blend with their natural surroundings. This camouflage in nature protects them against their enemies.

There are four migratory flyways in North America—the Atlantic, Mississippi, Central and Pacific.

Scientists and ornithologists still argue the reasons for migrations, but it is commonly agreed that snow and ice make it hard for them to find food, consequently they move southward. This has been going on from time immemorial, but no one knows exactly what starts the birds on their migrations.

According to scientists the crow is considered the most intelligent bird.

Loons are able to outswim most fish and have been caught at depths of 164 feet.

The arctic tern flies farther than any other bird—from the Arctic to the Antarctic, 22,000 miles.

Two or three nests of sparrows, robins or bluebirds near a garden will help to control tomato worms, cabbage worms and leaf beetles.

A bird's crop and gizzard grinds up the seeds. The crop is used for storing the undigested food.

Some seeds which birds eat do not digest but pass through their bodies, fall to the ground and sprout into new plants.

Some birds are named for their songs like the bobwhite, whippoorwill, and cuckoo.

APPENDIX A

A CHECK LIST OF THE BIRDS OF PENNSYLVANIA

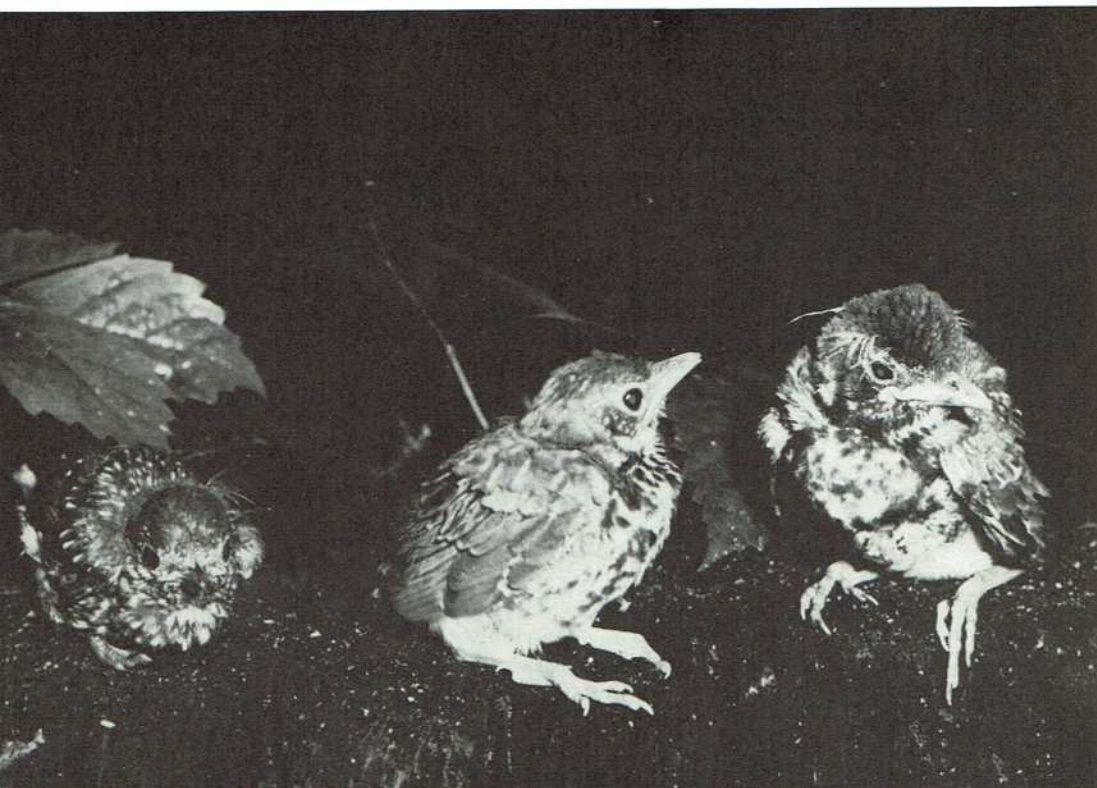
Permanent resident birds are species that are commonly found in Pennsylvania throughout the year. It does not follow that a species placed in this category is non-migratory. On the contrary many individuals of certain species do move southward in the fall, and these may be considered migratory, yet, each winter, certain individuals of a number of species remain in Pennsylvania. These are noted under "Migrants."

Migrants, then, are birds that pass through Pennsylvania in the spring and fall, enroute north and south. Some individuals of these species stop in Pennsylvania to nest. They are not true summer residents because their breeding here is never dependable, and these have been placed under "Migrants" rather than under "Summer Residents." Their status, however, has been noted.

The Summer Resident birds are those that are here only during the breeding season. They are birds that come north in the spring and return south in the fall. Although quite a few of the species listed here do not nest in all parts of the state, yet, all are birds that one may expect to nest in Pennsylvania year after year. Those that are more or less "local" in their nestings, have been noted.

Young thrushes.

Photo by Hal H. Harrison.



Among the Summer Residents there are some species that winter occasionally in Pennsylvania. Since these are not entirely dependable winter residents, they have not been listed among the "Permanent Residents," but their tendencies to winter occasionally have been noted.

Finally, I have listed the Casuals. These are species that are most irregular in their comings and goings. They belong on no other list. There are scores of other birds, not listed, whose appearance in Pennsylvania must be considered accidental or so rare as not to be worthy of mention.

The following list is not one hundred percent complete, but it names far more Pennsylvania birds than the average citizen may hope to see and identify in a lifetime.

Winter Residents

Rough-legged Hawk (irregular)
Herring Gull
Glaucous Gull (rare)
Great Black-backed Gull (rare)
Lapland Longspur (rare)
Snowy Owl (irregular)
Gyrfalcon
Horned Lark
Brown Creeper (nests rarely)
Tree Sparrow
Golden-crowned Kinglet
Northern Shrike (rare)
Evening Grosbeak (irregular)
Redpoll (rare)
Pine Siskin (irregular, nests occasionally)
Red Crossbill (irregular)
White-winged Crossbill (irregular)
Slate-colored Junco (nests locally)
Snow Bunting (irregular)

Permanent Residents

Turkey Vulture
Hawks
- Goshawk
- Sharp-shinned
- Cooper's
- Red-tailed
- Red-shouldered
- Duck
- Sparrow

Bald Eagle
Ruffed Grouse
Bobwhite Quail
Ring-necked Pheasant
Wild Turkey
Owls
- Barn
- Screech
- Great-horned
- Barred
- Long-eared
- Short-eared
- Saw-whet (rare)

Woodpeckers
- Pileated
- Red-bellied (local)
- Hairy
- Downy

Bluejay
Raven (rare)
Crow
Fish Crow (rare)
Black-capped Chickadee
Carolina Chickadee
Tufted Titmouse
White-breasted Nuthatch
Carolina Wren
Cedar Waxwing (irregular)
Starling
English Sparrow
Cardinal
Goldfinch
Song Sparrow
Mockingbird (local)

Migrants

Common Loon (winters occasionally)
Red-throated Loon (winters occasionally)
Grebes
- Holboell's (winters occasionally)
- Horned (winters occasionally)

Double-crested Cormorant
Whistling Swan
Goose
- American Brant (rare)
- Lesser Snow (rare)
- Blue (rare)

Ducks
- Gadwall (nests rarely)
- European Widgeon
- Baldpate
- Pintail
- Barred
- Green-winged Teal (nests rarely)
- Blue-winged Teal (nests occasionally)
- Shoveller
- Redhead

Hudsonian Curlew (rare)
Solitary Sandpiper
Greater Yellow-legs
Lesser Yellow-legs
Sandpiper
- Pectoral
- White-rumped
- Baird's
- Least
- Red-backed
- Stilt
- Semipalmated
- Western (rare)

Eastern Dowitcher
Sanderling
Northern Phalarope (rare)
Gulls
- Ring-billed (winters locally)
- Laughing
- Bonaparte's (winters locally)

Caspian Tern

- Ring-necked (winters locally)
- Canvasback (winters locally)
- Greater Scaup (winters locally)
- Lesser Scaup
- American Goldeneye (winters occasionally)
- Bufflehead
- Old-squaw
- White-winged Scoter (rare)
- Surf Scoter (rare)
- American Scoter (rare)
- Ruddy (nests rarely)

Mergansers
- Hooded
- American (winters locally)
- Red-breasted

Golden Eagle
Pigeon Hawk (rare)
Yellow Rail (rare)
Black Rail (rare)
American Coot (nests rarely)
Plover
- Semipalmated
- Golden
- Black-bellied

Ruddy Turnstone
Yellow-bellied Flycatcher
Gray-cheeked Thrush
Ruby-crowned Kinglet (winters occasionally)
Philadelphia Vireo (rare)
American Pipit
Warblers
- Prothonotary (nests rarely)
- Tennessee
- Orange-crowned
- Nashville (nests rarely)
- Cape May
- Myrtle (winters occasionally)
- Bay-breasted
- Black-poll
- Palm
- Connecticut
- Wilson's

Rusty Blackbird (winters occasionally)
Sparrows
- Nelson's (N. W. Pa.)
- Lark (nests rarely)
- Bachman's (nests rarely)
- White-crowned
- Fox
- Lincoln's

Summer Residents

Herons
- Great Blue
- Black-crowned Night
- Yellow-crowned Nght
- Pied-billed Grebe (local)

American Bittern
Canada Goose (winters occasionally)
Mallard Duck (winters occasionally)
Black Duck (winters occasionally)
Blue-winged Teal
Wood Duck
Black Vulture (rare)
Broad-winged Hawk
Marsh Hawk (winters occasionally)
Osprey (rare)
King Rail (rare)
Sora Rail
Florida Gallinule (local)
Piping Plover (rare)
Upland Plover (local)
Killdeer
Woodcock (winters occasionally)
Wilson's Snipe (local)
Spotted Sandpiper
Common Tern (rare)
Black Tern (local)
Mourning Dove (winters occasionally)
Yellow-billed Cuckoo
Black-billed Cuckoo
Whippoorwill
Nighthawk
Chimney Swift
Ruby-throated Hummingbird
Belted Kingfisher (winters occasionally)
Flicker (winters occasionally)
Red-headed Woodpecker (winters occasionally)
Yellow-bellied Sapsucker (rare)
Kingbird
Crested Flycatcher
Phoebe
Acadian Flycatcher
Alder Flycatcher
Least Flycatcher
Olive-sided Flycatcher (rare)
Yellow-bellied Flycatcher (rare)
Baltimore Oriole
Orchard Oriole (local)
Cowbird
Swallows
- Bank
- Barn
- Cliff
- Rough-winged
- Tree

Purple Martin
Catbird (winters occasionally)
Brown Thrasher (winters occasionally)
Robin (winters occasionally)
Thrushes
- Wood
- Hermit (local, winters occasionally)
- Olive-backed (rare)
- Wilson's or Veery

Bluebird (winters occasionally)
Blue-gray Gnatcatcher (local)
Migrant Shrike (local)
Vireos
- White-eyed (local)
- Yellow-throated
- Blue-headed
- Red-eyed
- Warbling

Warblers
- Black and White
- Prothonotary (rare)
- Worm-eating (local)
- Nashville
- Golden-winged
- Blue-winged
- Parula (local)
- Yellow
- Magnolia
- Black-throated Blue
- Black-throated Green
- Cerulean (local)
- Blackburnian
- Chestnut-sided
- Prairie (local)
- Oven bird
- Pine (local)
- Northern Water Thrush
- Louisiana Water Thrush
- Kentucky
- Mourning (local)
- Yellow-throated
- Hooded
- Yellow-breasted Chat
- Canada
- Redstart

Bobolink
Meadowlark (winters occasionally)
Red-winged Blackbird (winters occasionally)
Wood Pewee
Common Grackle (winters occasionally)
Scarlet Tanager
Rose-breasted Grosbeak
Indigo Bunting
Purple Finch (local, winters occasionally)
Red-eyed Towhee (winters occasionally)
Sparrows
- Bachman's (rare)

Red-breasted Nuthatch (rare, winters occasionally)
Wrens
Bewicks (local)
House
Long-billed Marsh
Short-billed Marsh
Winter (winters regularly)

Chipping
Field (winters occasionally)
Grasshopper
Henslow's
Lark (rare)
Savannah
Swamp (winters occasionally)
Vesper

Casuals

Gannett
Glossy Ibis
Wood Ibis
Flamingo
European Teal
European Widgeon
Clapper Rail
American Oystercatcher
Hudsonian Godwit
Parasitic Jaeger
White Pelican
American Egret
Snowy Egret
Reddish Egret
Great White Heron
Little Blue Heron
Louisiana Heron
Marbled Godwit
Avocet
Bohemian Waxwing
Leach's Petrel
Pine Grosbeak
Madera Petrel
Wilson's Petrel
Magnificent Frigate-bird
Hutchins' Goose
White-fronted Goose
Barrow's Goldeneye
Harlan's Hawk
Swainson's Hawk
Sandhill Crane
Purple Gallinule
Mute Swan (feral)
King Eider
Swallow-tailed Kite (6 records)
Black-bellied Plover
Golden Plover
Piping Plover
Wilson's Plover
Willett
Knot

Franklin's Gull
Great Black-backed Gull
Iceland Gull
Forster's Tern
Least Tern
Roseate Tern
Scotty Tern
Brunnich's Murre (5 records)
Dovekie
Red Phalarope
Wilson's Phalarope
Kitiwake
Ground Dove
Great Gray Owl
Hawk Owl
Richardson's Owl
Arctic Three-toed Woodpecker
Red-cockaded Woodpecker
Scissor-tailed Flycatcher
Arkansas Kingbird
Say's Phoebe
Bicknell's Thrush
Greenland Wheatear
Philadelphia Vireo
Audubon's Warbler
Townsend's Warbler
Yellow-throated Warbler
Brown-capped Chickadee
Summer Tanager
Greater Redpoll
Hoary Redpoll
Dickcissel
Oregon Junco
Bohemian Waxwing
Blue Grosbeak
Pine Grosbeak
Gambel's Sparrow
Golden-crowned Sparrow
White-throated Sparrow (nests, winters occasionally)

APPENDIX B

REFERENCE LIST OF USEFUL PUBLICATIONS ON BIRDS

THE BOOK OF BIRD LIFE—by Dr. Arthur Allen, D. Van Nostrand Co., Inc., New York City.

AN INTRODUCTION TO THE BIRDS OF PENNSYLVANIA—by Dr. George M. Sutton, cloth bound, 169 pages, 156 illustrations, published by the J. Horace McFarland Co., Harrisburg.

BIRDS OF WESTERN PENNSYLVANIA—by W. E. Clyde Todd, Carnegie Museum, Pittsburgh; 118 species beautifully illustrated in color.

BIRDS OF AMERICA—by T. Gilbert Pearson, John Burroughs, Edward H. Forbush and others, hundreds of photographs and line drawings, 106 color plates by Louis Agassiz Fuertes and five pages of reproductions of eggs in their natural size and color, published by Garden City Publishing Co., Inc., Garden City, New York.

FIELD BOOK OF WILD BIRDS AND THEIR MUSIC—by F. Schuyler Matthews, 325 pages profusely illustrated in color and halftones, published by G. F. Putnam's Sons, The Knickerbocker Press, New York.

REED'S BIRD GUIDES—Garden City Publishing Co., New York. Small pocket guides of land and water birds in full color with descriptions.

HANDBOOK OF BIRDS OF EASTERN NORTH AMERICA—by Frank M. Chapman, 431 pages profusely illustrated, published by D. Appleton & Co., New York.

PETERSON'S FIELD GUIDE—167 pages. Text and illustration in color and black and white; giving field marks of all species found in eastern North America. Houghton-Mifflin Co., Cambridge, Mass.

The following publications may be ordered from the Publications Division, Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C. 20250. There is no charge.

Attracting Birds

Homes for Birds

Some Common Birds Useful to the Farmer

For those who are interested in bird migration, we suggest the following paid publication available from the same source.

Migration of Birds $.35

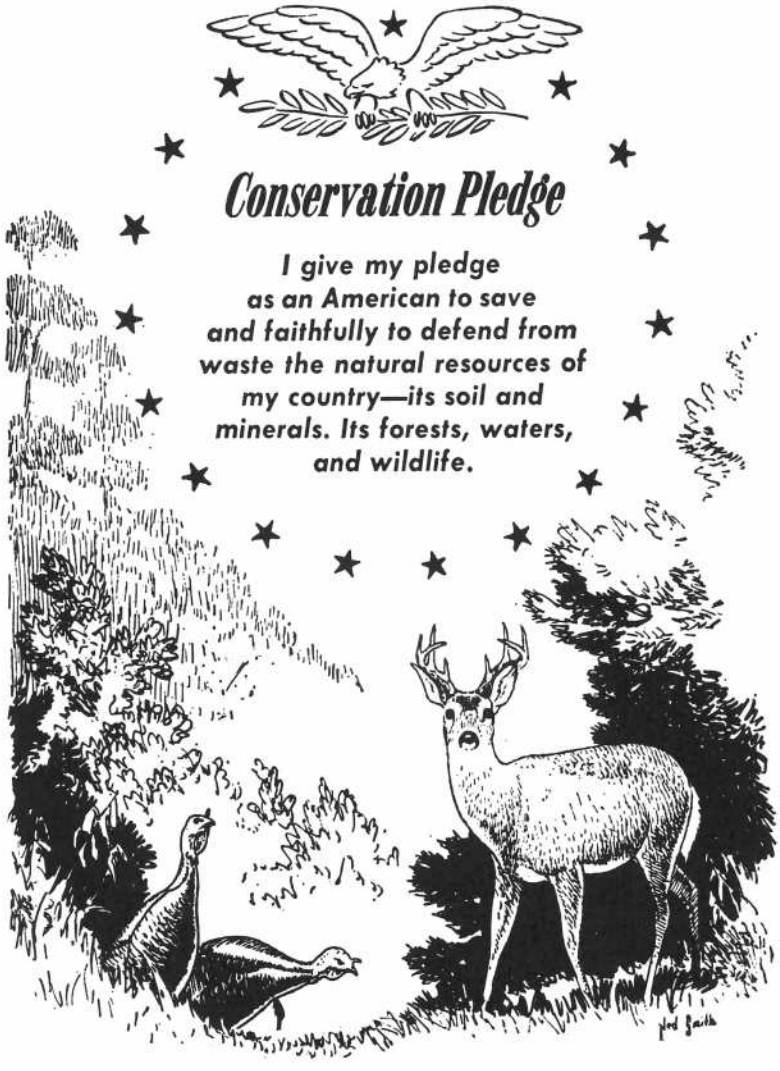
AUDUBON MAGAZINE—published by the National Audubon Society, 1130 Fifth Avenue, New York 28, N. Y. One year subscription $7.00, 2 years $12.00.

AUDUBON FIELD NOTES—published by the National Audubon Society, 1130 Fifth Avenue, New York 28, N. Y. Reports the distribution, migration and abundance of birds. It is a requisite for active bird watchers because its seasonal reports offer the only way to keep informed about what birds are being seen where in your region. Subscription for 1 year, $4.00; 2 years, $7.00; 3 years, $10.00.

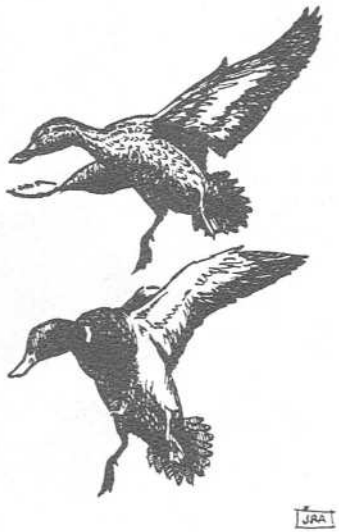
The Audubon Society also publishes several pamphlets on attracting birds, bird charts and bird cards of particular value in bird study.

Pied-billed grebe at nest

Photo by Karl Maslowski.


Conservation Pledge
I give my pledge
as an American to save
and faithfully to defend from
waste the natural resources of
my country—its soil and
minerals. Its forests, waters,
and wildlife.

HELP RESTORE



WATERFOWL